PB88-185731

Superfund Record of Decision (EPA Region 5) Northern Engraving Corporation Sparta, Wisconsin (First Remedial Action), September 1987

(U.S.) Environmental Protection Agency
Washington, DC

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September 1987

EPA

Superfund Record of Decision:

Northern Engraving, WI

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16. ABSTRACT

The Northern Engraving Corporation (NEC), located in Sparta, Wisconsin, presently owns and operates a manufacturing facility at the site, which produces metal name plates, dials and decorative trim for the automotive industry. The majority of the land within the Sparta area is zoned for general agriculture which includes livestock raising, nursery, greenhouse and poultry farming. Four separate areas of contamination at the NEC facility have been identified as potential sources of soil, ground water and surface water contamination. They include the sludge lagoon, seepage pit, sludge dump site and lagoon drainage ditch. The chemical constituents found in these areas are from past wastewater treatment and disposal practices employed at the site. Since the 1960s waste rinse waters and by-products of the metal finishing process have been treated onsite. An onsite wastewater treatment lagoon was installed in 1967. Rinse water from the plant was collected and treated with sodium hydroxide for precipitation to metal hydroxide solids. The treated rinse water was discharged to the sludge lagoon to allow solids to settle. The treated lagoon effluent was discharged to the LaCrosse River by way of a storm drainage ditch. Between 1968 and 1976 the sludge lagoon accumulated solids from the treated wastewater. On two occasions, sludge was removed from the lagoon and landfilled in an onsite dump area. The sludge lagoon was eventually removed from service in 1980, by which time two to
(See Attached Sheet)

17. KEY WORDS AND DOCUMENT ANALYSIS		
a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Record of Decision Northern Engraving, WI First Remedial Action - Final Contaminated Media: gw, soil, sw Key contaminants: inorganics, metals, TCE		
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Northern Engraving, WI
First Remedial Action - Final

16. ABSTRACT (continued)

sludge had accumulated on the bottom of the lagoon and presently remains. An onsite seepage pit was employed to neutralize spent acid waste. It was removed from service, filled with approximately five feet of clean fill and graded in 1981. A new above onsite ground wastewater treatment system was installed in 1976 and modified in 1984 to meet more stringent State effluent standards. Approximately 900 yd^3 of sludge is contaminated with phosphorous, aluminum, cadmium, copper, nickel, iron and fluoride. The drainage ditch is contaminated with fluoride, aluminum, chromium and copper; the seepage pit is contaminated with trichloroethylene (TCE); and ground water is contaminated with copper, nickel and zinc.

The selected remedial action for this site includes: excavation and onsite solidification of approximately 4,400 yd^3 of sludge and soil; installation of a RCRA cover atop the lagoon; application of access and deed restriction to the seepage pit property; and ground water monitoring. The estimated total capital cost for this remedial action is $295,000 with annual O&M of $16,000.

RECORD OF DECISION
REMEDIAL ALTERNATIVE SELECTION

I. Site Name and Location

Northern Engraving Corporation (NEC)
803 South Black River Street
Sparta, Wisconsin 54656

II. Statement of Purpose

This decision document represents the selected remedial action for the NEC site developed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986; and the National Contingency Plan, 40 CFR Part 300, November 20, 1985.

The State of Wisconsin has concurred on the selected remedy.

III. Statement of Basis

This decision is based upon the Administrative Record which includes the remedial investigation report and feasibility study, and other related documents. The attached index to the administrative record identifies the complete list of items upon which the selection of remedy is based.

IV. Description of the Selected Remedies

A. Source Control

1. Excavate and place contaminated materials from the drainage ditch and sludge dump site in the sludge lagoon for solidification.

2. All contaminated materials in the sludge lagoon will be solidified, and the lagoon will be provided a RCRA cover and monitored for proper closure.

3. Restrict access and apply deed restrictions to the seepage pit property.

B. Management of Migration

Ground water contamination will be regulated and monitored through the use of alternate concentration limits (ACLs) to be applied downgradient of the sludge lagoon and the seepage pit.

C. Operation and Maintenance

The cover over the sludge lagoon and the seepage pit will be routinely inspected and monitored. Semi-annual ground water sampling and analyses at compliance monitoring wells will be conducted.

V. Declaration

The selected remedy is protective of human health and the environment, attains Federal and State requirements that are applicable or relevant and appropriate, and is cost-effective. This remedy satisfies the preference for treatment that reduces toxicity, mobility, or volume as a principal element. Finally, it is determined that this remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable.

9-28-87
DATE

for Valdas V. Adamkus
Regional Administrator

Summary of Remedial Alternative Selection;
Northern Engraving Corporation
Sparta, Wisconsin

I. Site Location and Description

The Northern Engraving Corporation (NEC) site is located in Sparta, Wisconsin at 803 South Black River Street (Figure 1). NEC presently owns and operates a manufacturing facility at the site, which produces metal name plates and dials for the automotive industry. Sparta is a moderately sized rural community (population 6,800) in western Wisconsin that lies approximately 25 miles due east of LaCrosse and 150 miles northwest of Madison.

The NEC facility is located on the south edge periphery of the residential and business areas of Sparta. The LaCrosse River constitutes the southern boundry of the site and portions of the site lie within the river's flood plain (Figure 2). The closest city residence is approximately one-quarter mile away from the site. Within the confines of the city limits, potable water is obtained primarily through a municipal distribution system that draws water from three production well fields. The city well to the site is located at the "west well field" which lies approximately 4,000 feet from the NEC facility. The Sparta area is primarily served by a sandstone aquifer in the Trempealeau-Black River Basin. The municipal wells range in depth from 105 to 260 feet. The sandstone aquifer yields between 400 to 700 gallons per minute at these wells.

Most residences in the city obtain water from the city distribution system. Seven residences have private wells, the closest of which is located approximately 2,500 feet from the NEC facility. All private wells within a three mile radius of the NEC facility are completed in the sandstone aquifer. Figure 3 identifies the location of the city's municipal well fields and private water supplies.

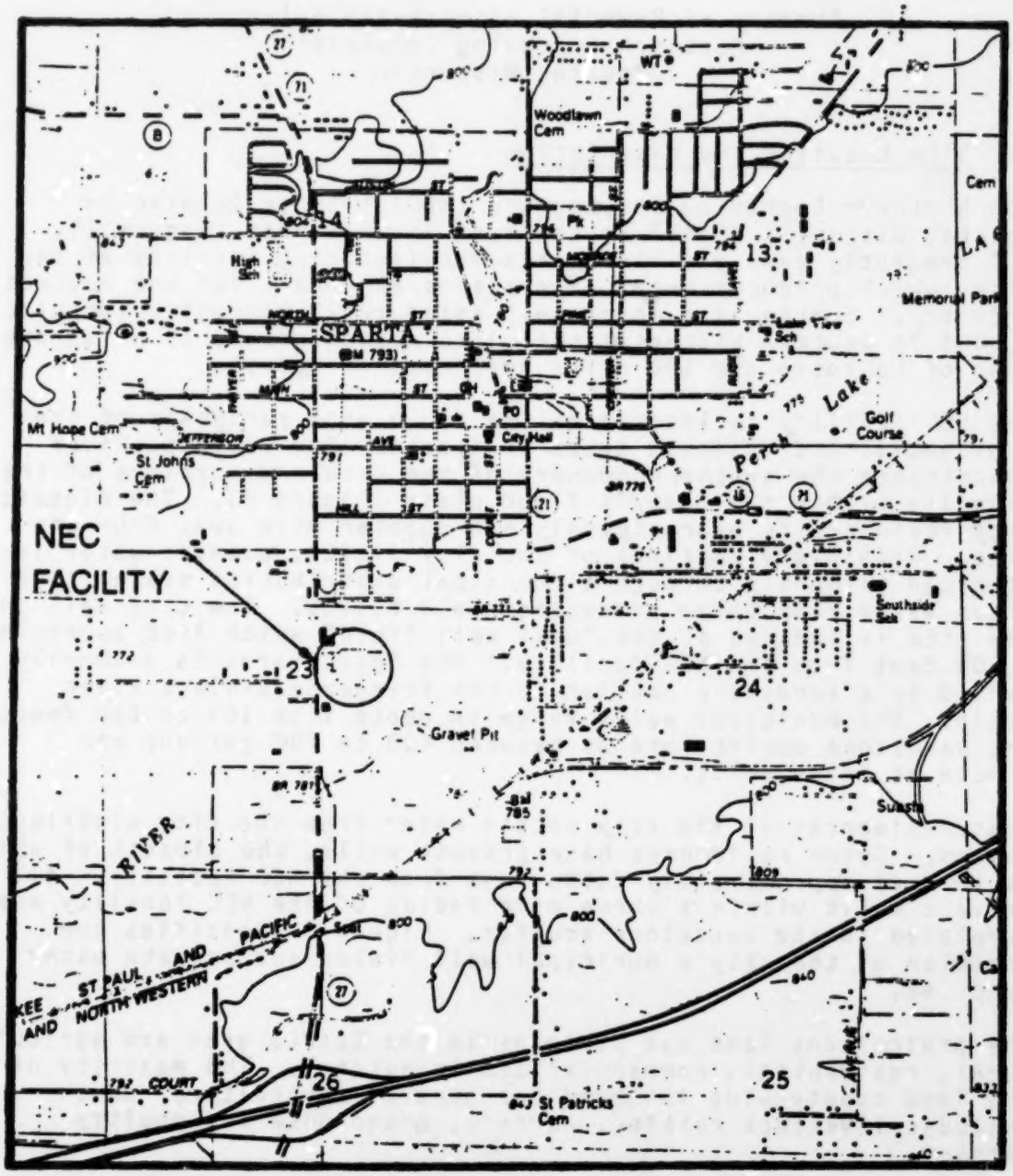
The predominant land use patterns in the Sparta area are agricultural, residential, commercial and industrial. The majority of the land county-wide is zoned for general agriculture, which includes livestock raising, nursery, greenhouse and poultry farming.

Four separate areas of contamination on the NEC facility have been identified as potential sources of soil, ground water, and surface water contamination. These areas are identified in Figure 4 and include the sludge lagoon, seepage pit, sludge dump site, and lagoon drainage ditch. The chemical constituents found in these contamination areas were the result of past wastewater treatment and disposal practices employed at the site. In September, 1983, NEC was placed on the Superfund National Priorities List based on its score calculated by the Hazardous Ranking System.

NORTHERN ENGRAVING CORP.

Sparta, Wisconsin

FIGURE 1



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LOCATION MAP

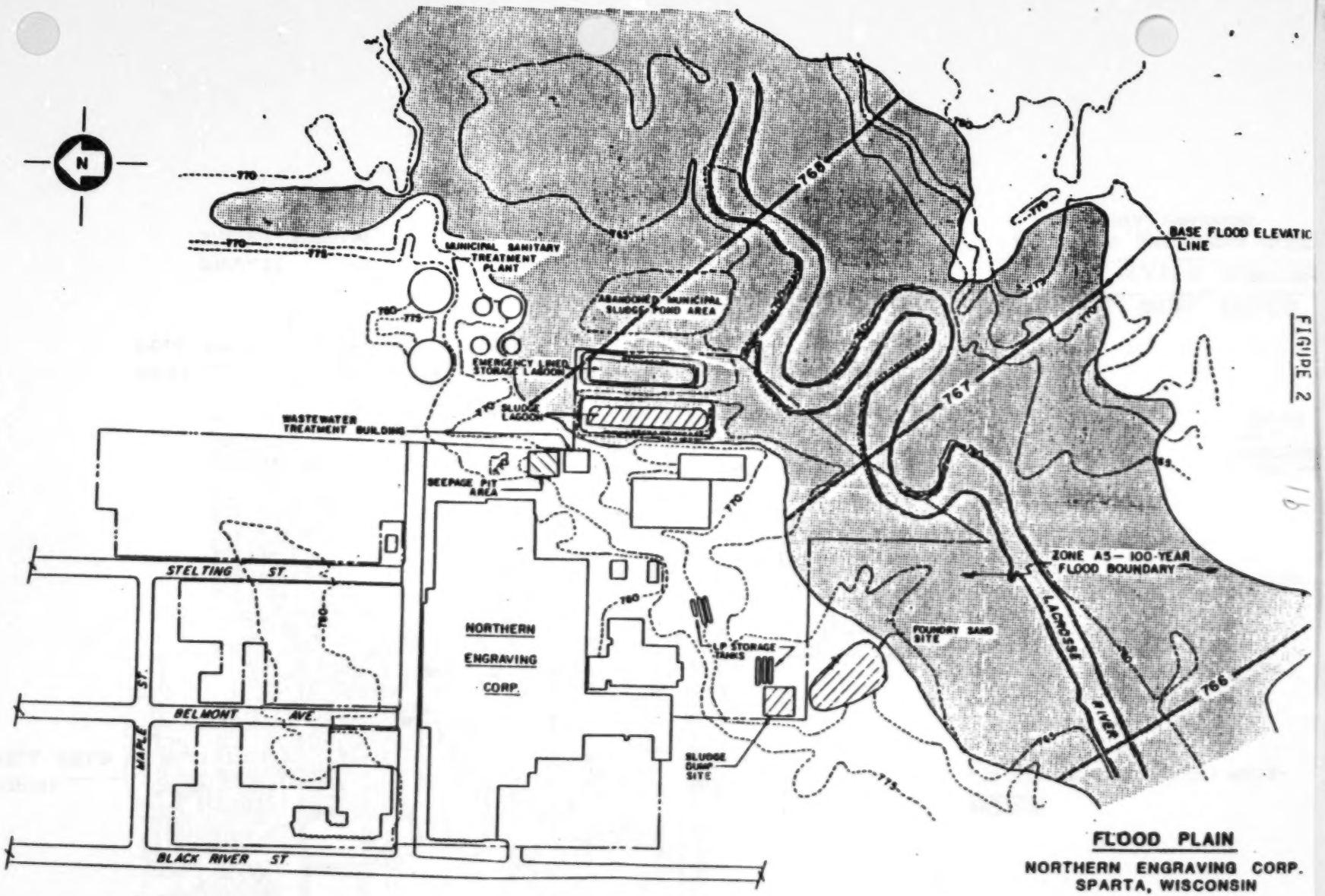
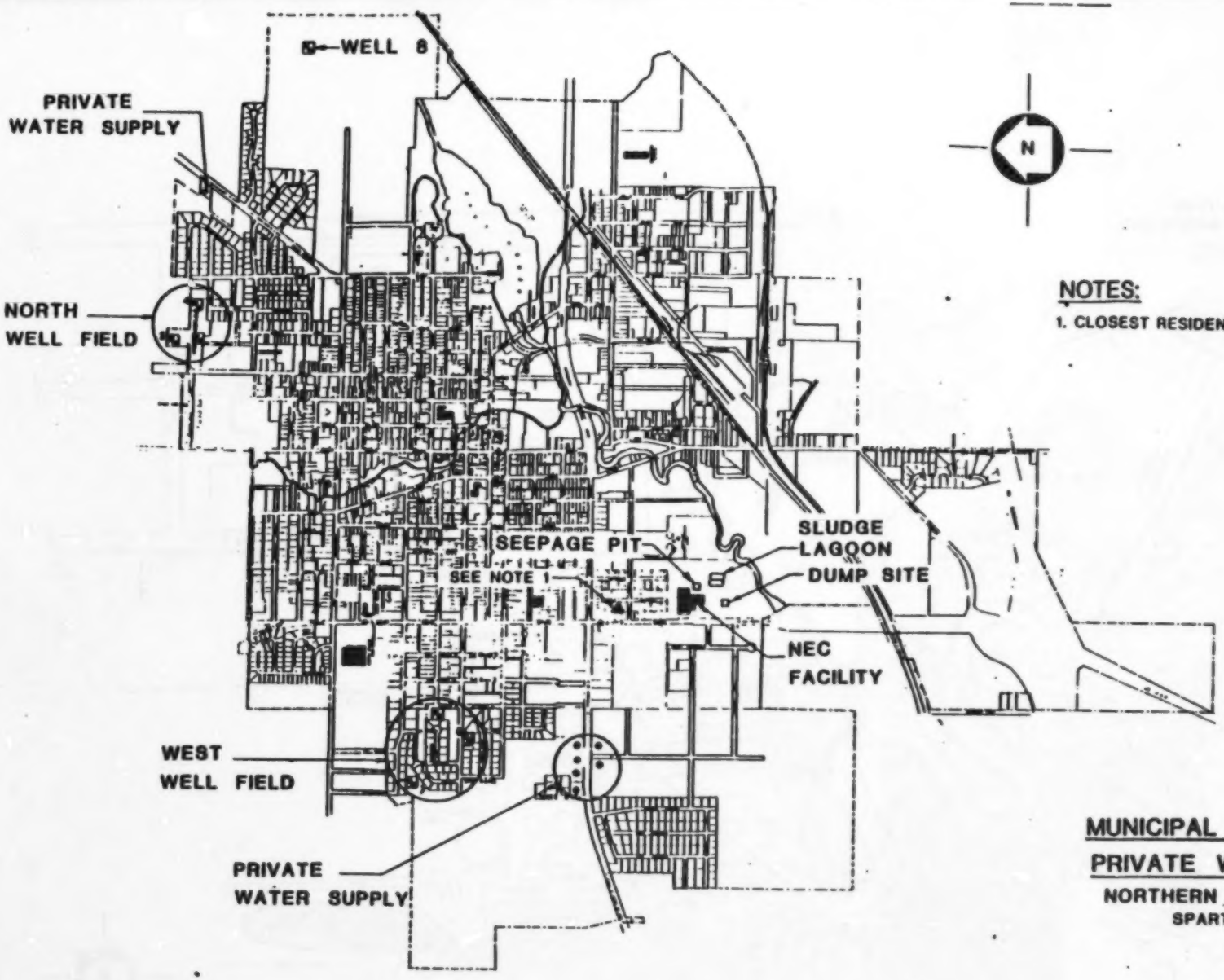


FIGURE 2

FLOOD PLAIN

NORTHERN ENGRAVING CORP.
SPARTA, WISCONSIN

FIGURE 3



NOTES:

1. CLOSEST RESIDENCE ON CITY WATER

SCALE

MUNICIPAL WELL FIELDS
PRIVATE WATER SUPPLIES

NORTHERN ENGRAVING CORP
SPARTA, WISCONSIN

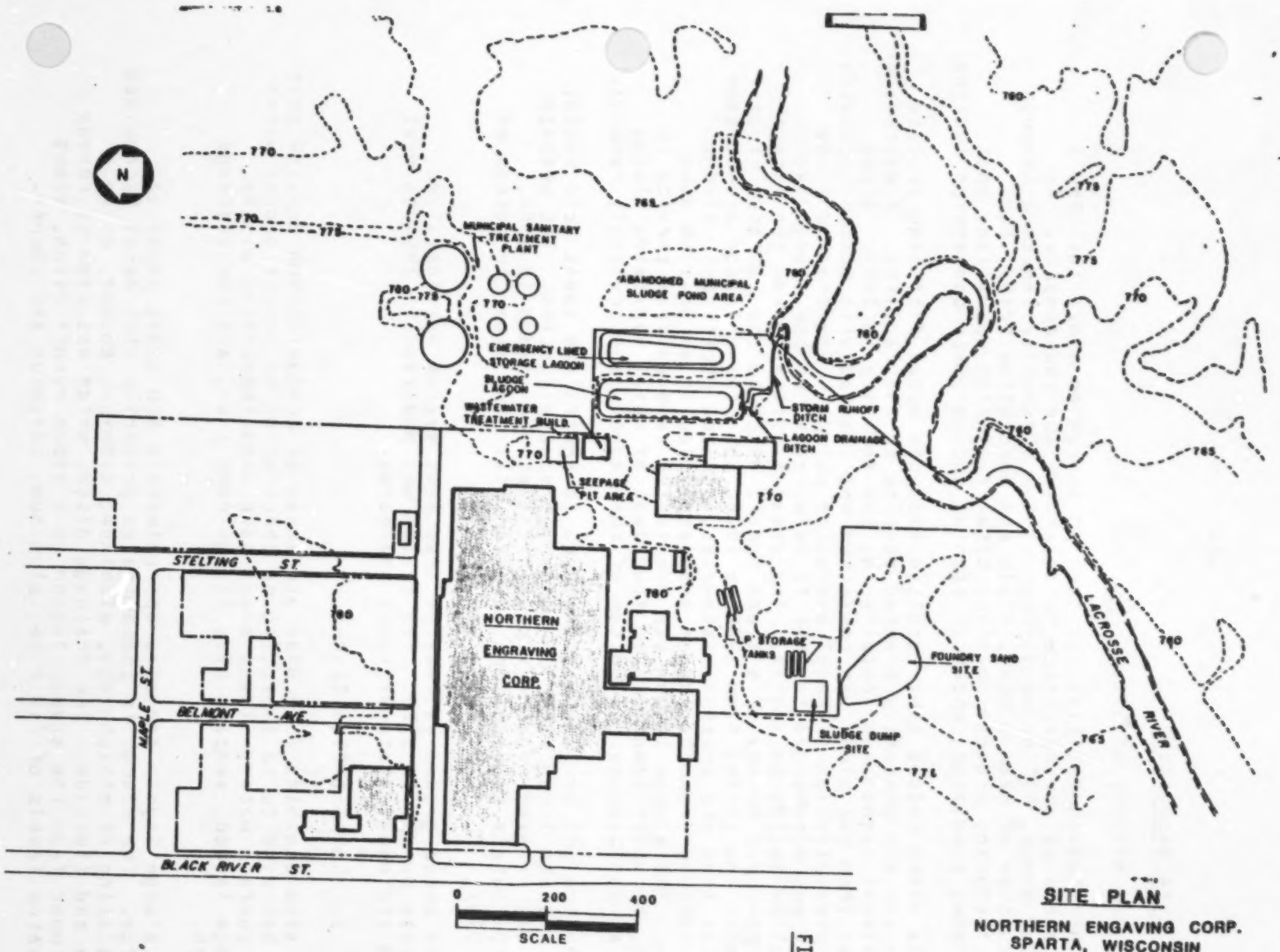


FIGURE 4

SITE PLAN

NORTHERN ENGAVING CORP.
SPARTA, WISCONSIN

II. Site Background

1. History of Site

The NEC Sparta facility has been in operation since the 1960's and serve as the corporate headquarters for the company. As stated above, NEC primarily serves the automotive industry through production of name plates, dials and decorative trim. The manufacturing process involves metal finishing operations that includes anodizing, chemical etching and chromate conversion coating.

Waste rinse waters that resulted from the metal finishing process were and are presently treated on-site at the facility. A wastewater treatment lagoon was installed at the facility in 1967. Rinse water from the plant was collected and treated with sodium hydroxide for precipitation of metal hydroxide solids. The treated rinse water was discharged to what is referred to as the sludge lagoon to allow solids to settle. The treated effluent from the lagoon was conveyed by way of a storm runoff ditch to the LaCrosse River. Between the period from 1968 to 1976, the sludge lagoon accumulated solids from the treated wastewater. On two occassions, sludge was removed from the lagoon and landfilled in an on-site dump area. The sludge lagoon was eventually removed from service in 1980, by which time, two to four feet of metal hydroxide sludge had accumulated on the bottom of the lagoon, and presently remains.

A seepage pit on-site was employed to neutralize spent acid waste; the pit was lined with limestone for neutralization. The seepage pit was removed from service and filled and graded in 1981. Approximately fifteen feet of clean fill lies atop the bottom of the pit.

A new above ground wastewater treatment system was installed on-site by NEC in 1976. The system was modified in 1984 to meet more stringent state effluent standards.

2. Current Site Status

The site exhibits four discrete areas of contamination on-site that are believed to be impacting or threatening to impact ground water and surface water. These areas have been identified as the sludge lagoon, seepage pit, sludge dump area, and the drainage ditch.

The sludge lagoon contains approximately 900 cubic yards of sludge. The sludge is contaminated primarily with metal hydroxides consisting of phosphorous, aluminum, cadmium, copper, nickel, iron and fluoride. The drainage ditch, which was used to convey effluent from the sludge lagoon to a storm runoff ditch, shows elevated levels of fluoride, aluminum, chromium and copper.

The sludge dump was utilized on two occasions to dispose of approximately 930 cubic yards of sludge from the sludge lagoon. The sludge dump was removed from service in 1980 and was eventually backfilled with native soil and vegetated. Down gradient monitoring wells have not detected contaminants attributable to the sludge dump. The same metal hydroxides that are found in the sludge lagoon are also evident in the sludges of the sludge dump.

The seepage pit was used to dispose of rinses and dye solutions containing concentrated aluminum and fluoride. Paint residues from ink well operations were also discharged to the seepage pit. Ground water monitoring within the seepate pit and downgradient from the seepage pit and sludge lagoon have detected trace amounts of volatile organics, such as 1, 1, 1-trichloroethane; 1, 1-dichloroethane; 1, 2-dichloroethylene; vinyl chloride; and trichloroethylene. Typically, the majority of the organics were below 100 parts per billion (ppb), except for trichloroethylene where concentrations were as high as 670 ppb. Elevated levels of heavy metals such as copper, nickel and zinc were also detected in downgradient monitoring wells.

3. Site Hydrology

The NEC facility is situated atop approximately 75 feet of alluvial deposits consisting of fine to medium grain sand. The alluvial sediments resulted from depositional events of earlier stages of the LaCrosse River. Underlying the alluvial deposits is the St. Lawrence Formation, a Cambrian age sandstone.

Ground water at the facility occurs at depths from between 2.5 to 11 feet below grade. Ground water direction trends towards the LaCrosse River, where it eventually discharges (Figure 5). A vertical gradient exists between the bedrock water elevation and the water table elevation. The vertical component of ground water flow results from the head differential between the surrounding higher elevations where the sandstone is recharged and the low lying valley at the facility where ground water discharges (Figure 6). Consequently, contamination of the alluvial deposits should theoretically not move downward into the sandstone formation.

Rising head tests undertaken at the site have determined permeability in the alluvial deposits to range between 4.17×10^{-3} to 1.56×10^{-2} cm/sec. Velocity of ground water was calculated to move between .43 and 1.6 feet per day.

4. Public Health Impact

In its current state, the NEC site presents little threat to the environment or to public health. The endangerment assessment (EA)

3a FIGURE 5

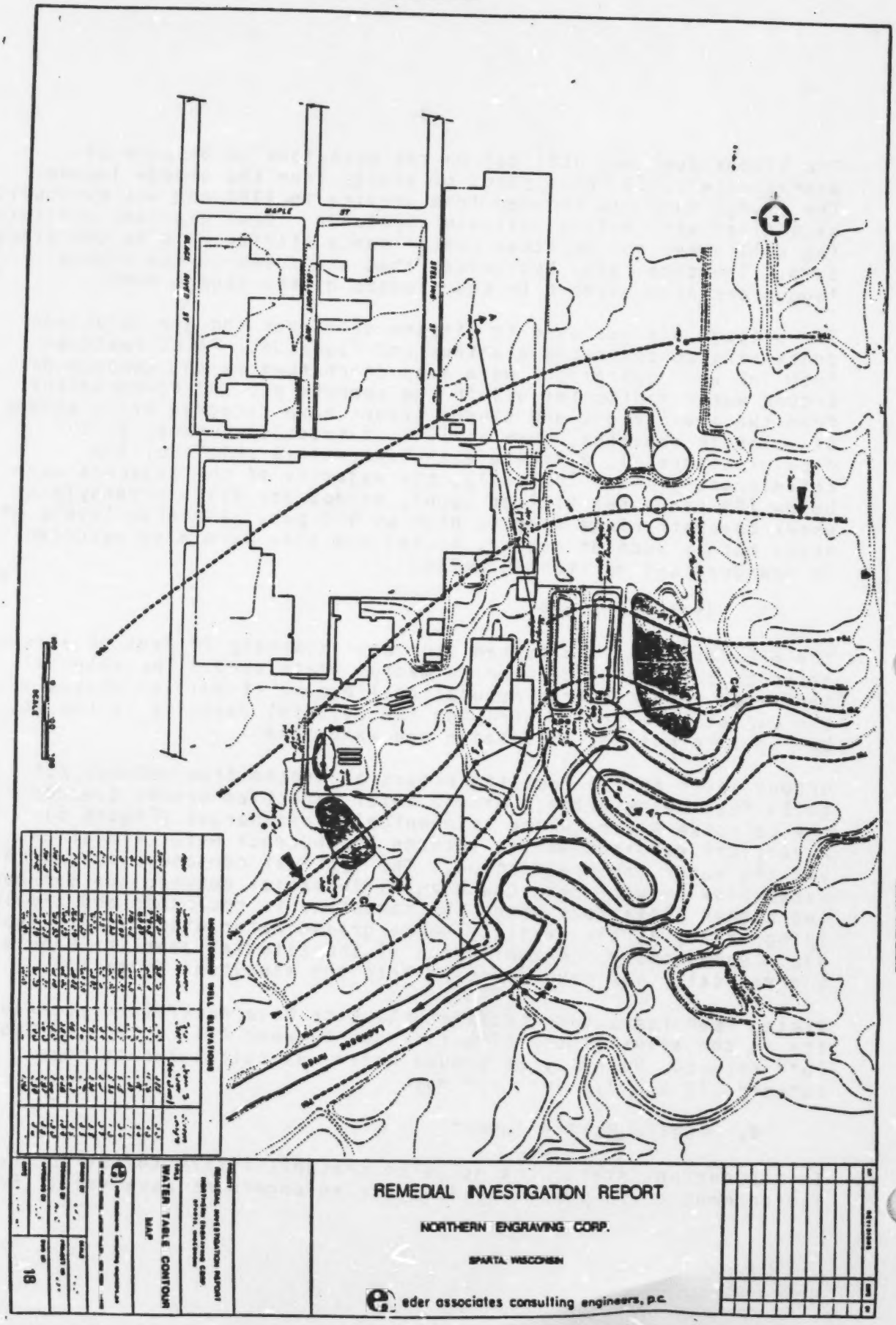
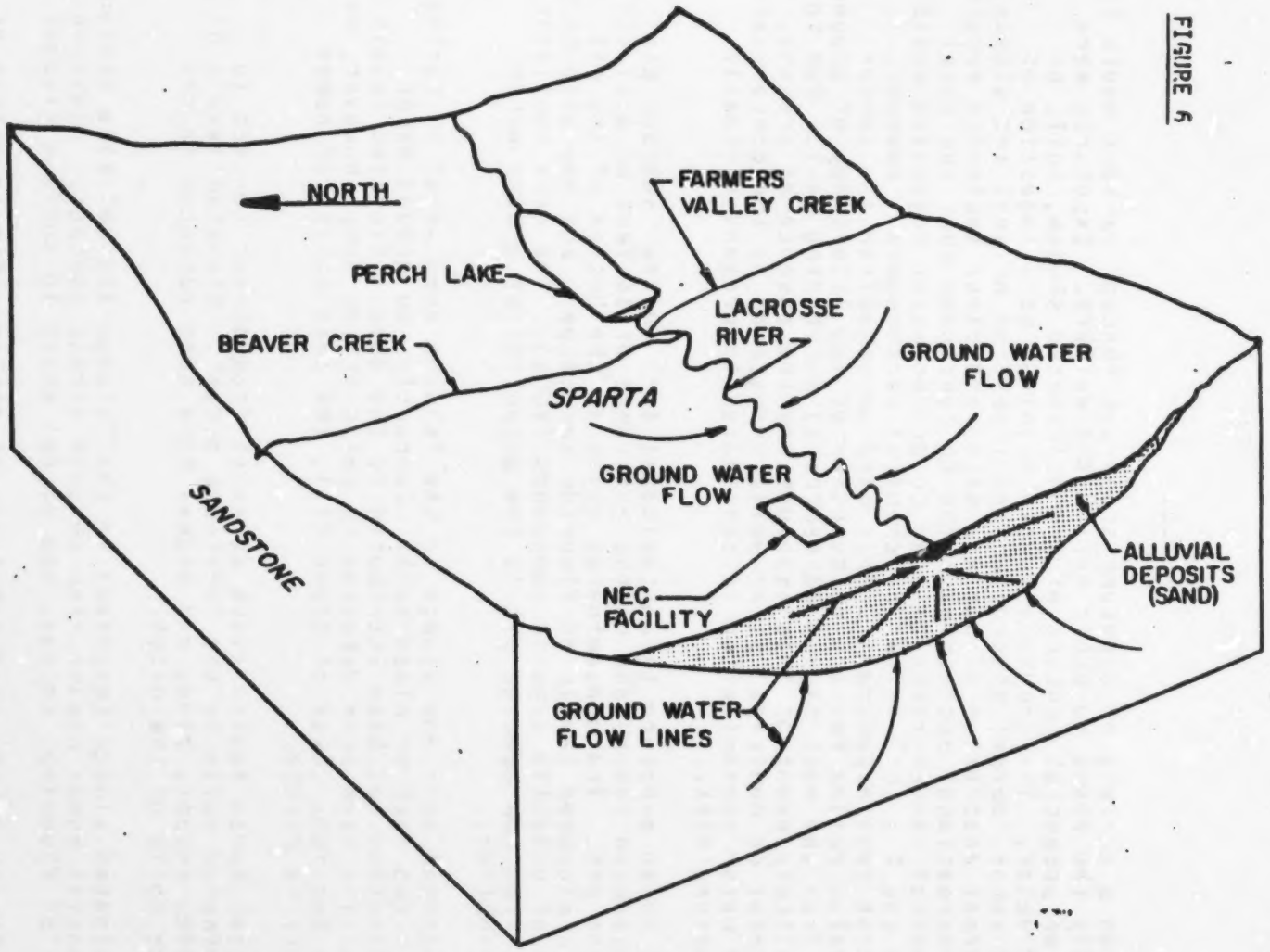

MAPLE ST
BLACK RIVER ST
SCALE
MONITORING WELL ELEVATIONS
WATER TABLE CONTOUR MAP
REMEDIAL INVESTIGATION REPORT
NORTHERN ENGRAVING CORP.
SPARTA, WISCONSIN
eder associates consulting engineers, p.c.
18

FIGURE 6



HYDROGEOLOGIC CONDITIONS IN THE SPARTA AREA

analyzed a variety of exposure scenarios through various media to quantify the risks to public health and welfare. Exposures were based on potential contact with contaminated sludge, soil, or ground water. The exposure routes examined were ingestion of ground water, dermal absorbtion and ingestion of soil and sludge, and dermal adsorbtion of surface water and river sediments resulting from recreational activities. The EA concluded that the total incremental cancer risks related to ground water ingestion would exceed the 1×10^{-6} value for chemical carcinogens. However, the worst case exposure scenario used to establish the cancer risk value called for the consumption of two liters/day of ground water from the most highly contaminated monitoring well. Due to the unlikely event of this exposure and the absence of private, industrial or municipal water wells threatened by the contamination, ground water contamination is considered to present virtually no exposure risk.

Direct human exposure to contaminated soil in the "seepage pit" is considered remote due to the existence of 15 feet of soil fill over the pit. The contaminated soils at the bottom of the pit contain elevated levels of fluoride and copper, and may also be a source of volatile organic compounds (VOCs). The only realistic threat from the seepage pit is the potential of ground water contamination.

Contaminated soil and sludge in the "sludge dump area" is buried beneath two feet of clean soil. Currently, no ground water contamination has been attributed to the dump. Elevated levels of fluoride have been detected in soils at the dump, however, due to the two foot cover of clean fill, the possibility of human exposure is remote.

Potential human health risks do exist from direct contact to contaminated soils in the "drainage ditch". Elevated levels of fluoride, copper, zinc, and nickel have been detected in the surface soils of the ditch.

Contaminated sludge (exposed) in the "sludge lagoon" also presents a potential human health risk through direct contact. Elevated levels of fluoride, copper, and nickel exist in surface sludges.

The LaCrosse River water exhibited no contaminants in excess of any surface water quality criteria, with the exception of zinc which meets the chronic toxicity criteria. However, the background levels of zinc in the river also appear to exist at the chronic toxicity criteria level. Trace amounts of trichloroethylene, fluoride, and zinc were detected in river water samples taken upstream and downstream from the facility. The EA states that inconclusive differences exist between the upstream and the downstream concentrations. River sediments revealed elevated levels of metals in downstream samples. The EA states that the levels of contamination in the sediments present no potential risks to aquatic species.

III. Enforcement

On September 10, 1985, the U.S. EPA Regional Administrator for Region V signed an administrative Consent Order (Order) with NEC that stipulates the undertaking of a remedial investigation (RI) and feasibility study (FS), and subsequent remedial action by NEC. As part of the RI, the Order required that an endangerment assessment be completed by NEC to determine the actual or potential harm presented by the site to public health, welfare or the environment.

The Order requires that NEC shall control conditions at the site which could potentially endanger health, welfare, or the environment and undertake the specific activities set forth in the Order. These activities include performance of a RI and FS and implementation of the recommended remedy for the site. The Order provides that all work plans, reports, and schedules necessary for the implementation of the selected remedy shall be made an integral and enforceable part of the Order. The agreement to conduct the remedial design and remedial action at the site is embodied in a CERCLA 106 Order, which does not require entering into a consent decree or the issuance of special notice letters.

IV. Community Relations

The signed Consent Order (Order) for undertaking the RI/FS and selected remedial measures went out for public comment in September, 1985. No comments were received on the Order at the end of the thirty date day period, the Order became effective thereafter.

The NEC site has generated little public interest or media attention since being identified as a potential Superfund site.

The FS went for a 21 day public comment period on August 27, 1987. An opportunity for a public meeting was provided for interested parties. Following the completion of the comment period on September 16, 1987, no comments were received on the FS. In addition, no interest in a public meeting was conveyed by any party.

V. Alternatives Evaluation

The feasibility study (FS) for the NEC site developed and evaluated an array of remedial alternatives for each discrete waste unit on-site. A series of screening criteria were employed to narrow the field of possible alternatives. The resulting final array of alternatives was analyzed in detail to select remedies that attain an acceptable level of effectiveness and implementability, and were the least costly.

Throughout the remedial alternatives screening process special consideration was provided to those alternatives that employed the use of treatment technologies which permanently and significantly reduce the toxicity, mobility, and volume of the waste. A set of remedial action objectives was established in the FS that would have to be met in the implementation of site remedies. The objectives were based on the results of the EA and information provided in the remedial investigation (RI). The EA concluded, as stated previously, that the site currently under present usage presents little or no environmental and public health threats. Consequently, the remedial action objectives emphasized the minimization of long-term contact with contaminated soil and sludge, and the prevention of ingestion of contaminated ground water. The following objectives were identified in the FS for site remedial actions:

- minimize possible contact with exposed contaminated sludge;
- minimize the possible contact with contaminated soil in the drainage ditch;
- minimize the possible contact with buried soils contaminated from past disposal practices; and,
- minimize the possible exposure to contaminated ground water, and adequately prevent migration.

Based on site information provided in the RI report and the above stated remedial action objectives, an array of potential general response actions and corresponding technologies were developed (Table 1) to address the specific conditions at the NEC site.

Table 1

GENERAL RESPONSE ACTIONS AND
APPLICABLE REMEDIAL TECHNOLOGIES

Response Action	Technologies
No action	Site Monitoring and land development restrictions
Containment	Capping, revegetation, ground water containment, barrier walls

Extraction	Ground water pumping
Solids Removal	Excavation of sludge and soil
On-site treatment	Solidification/chemical, physical fixation
In-situ treatment	Bioreclamation, soil flushing
On-site disposal	Landfill
Off-site disposal	Permitted facility

Preliminary technology screening criteria were employed in the FS to eliminate those technologies not applicable to the NEC site. The criteria were as follows:

1. There must be a demonstrated history of successful use of the technology in environments similar to the NEC site. All technologies of a research and development nature, and which cannot be reasonably said to be in common use, are rejected.

2. Technologies that are not relevant to site specific problems or cannot be applied because of physical constraints or that will tend to have uncertain outcomes because of physical constraints are rejected.

3. Technologies that, when applied, may cause other environmental or health related impacts are rejected.

4. Technologies which have or imply an overly long period between implementation and remedial effect or which have long permitting delays before implementation are rejected unless there is no other alternative that can achieve the remedial objective in a more time effective manner.

5. Technologies which are or must be implemented in concert with (or are linked to) another technology which is rejected are also rejected.

General response actions that were screened based on the above criteria were no longer considered for implementation at the NEC site. Table 2 presents those technologies excluded from further consideration.

Table 2

Eliminated Technologies

1. Vertical barriers for leachate and groundwater control.
2. Horizontal barriers for leachate and ground water control.
3. Bioreclamation for treatment of waste in place.
4. Cement-based solidification of sludges and soils.

Table 3 identifies the remaining technologies that were evaluated in application for remedial responses at the four discrete waste units. For a summary description of the general technologies considered applicable at the NEC site, refer to the FS.

TABLE 3

APPLICABLE TECHNOLOGIES

1. Leachate and Ground Water Controls
   a. Capping
   b. Revegetation
   c. Ground water pumping
2. Excavation and Removal of Sludge and Soil
3. Ground Water Treatment
   a. Chemical precipitation
   b. Carbon adsorbtion
   c. Air stripping
4. Sludge and Soil Treatment
   a. Solids dewatering
   b. Silicate-based solidification
   c. Thermoplastic solidification
5. Landfilling
   a. On-site disposal
   b. Off-site disposal

The FS singularly addressed each area of contamination on-site and developed a final array of remedial alternatives. The alternatives were developed and evaluated based on guidance and requirements

in the National Contingency Plan (NCP) 40 CFR § 300.68 (November 20, 1985) and the "Guidance on Feasibility Studies Under CERCLA" (June 1985). Table 4 presents the list of categories (as stated in the NCP) that to the extent that was both possible and appropriate, at least one remedial alternative was developed per category in the FS.

TABLE 4

REMEDIAL ALTERNATIVES CATEGORIES

1. Alternatives for treatment or disposal at an off-site facility, as appropriate.

2. Alternatives that attain applicable or relevant and appropriate federal public health and environmental requirements.

3. As appropriate, alternatives that exceed applicable and or relevant and appropriate federal public health and environmental requirements.

4. As appropriate, alternatives that do not attain applicable or relevant and appropriate federal public health and environmental requirements, but will reduce the likelihood of present of future threat from hazardous substances and provide significant protection to public health and welfare and the environment.

5. No action alternative.

In the initial screening of alternatives, the list of possible remedies was further reduced based on a preliminary comparison of the alternatives. In this phase of the FS, alternatives were identified based on criteria established in the remedial action categories (Table 4). A cursory analysis of environmental and public health impacts was undertaken to discern adverse or beneficial effect of the alternative relative to identified environmental and public health concerns. Preliminary cost estimates were prepared for each remedial alternative. All costs were developed in present dollar worth amortized at 10 percent over a 30 year period at +50% -30% range of confidence.

Alternatives were eliminated in this phase of the FS process by comparing cost of those alternatives that achieve similar environmental and public health results. Within each of the remedial action categories (Table 4), those remedial alternatives that achieve similar outcomes at a higher cost were eliminated from further consideration.

VI. Detailed Evaluation of Alternatives

The technologies that remained following the initial screening were analyzed in greater detail under a set of criteria that allowed for an across the board comparison of all the alternatives. A detailed evaluation was performed on each alternative which was based on non-cost and cost criteria. The non-cost criteria developed under the FS included technical feasibility, environmental and public health impact, and institutional requirements. The cost criteria analyzed the present worth of capital and operating expenses and a cost sensitivity analysis for a 10 to 30 year implementation period at various interest rates.

The technical feasibility criteria specifically addresses 1) reliability, 2) implementability, 3) safety, and 4) long-term performance of each alternative. The environmental and public health criteria analyzed the extent to which each alternative met those criteria, in addition to discussing other specific beneficial and adverse effects of the alternative. The evaluation of institutional requirements involved addressing applicable or relevant and appropriate federal and state requirements.

In the alternatives cost comparison, capital costs included all direct costs for remedy installation, in addition to indirect costs, such as fees for engineering, supervision of implementation, and general overhead expenditures. Yearly operating and maintenance costs were those defined necessary to ensure proper performance of the remedy over a specified period of time, such as costs for labor, materials, sampling analyses and administrative requirements. Based on the above stated criteria a "detailed evaluation" of each alternative was conducted in the FS. Alternatives were developed and evaluated for each of the four areas of contamination on-site, those identified as:

- Sludge Lagoon
- Drainage Ditch
- Seepage Pit
- Sludge Dump Area

The remedial action objectives identified in the "development of alternatives" section above were based on the stated conclusions in the EA. The "detailed analysis of alternatives" uses the remedial objectives as goals to be achieved through implementation of remedial actions.

1. Sludge Lagoon Alternative Array

A total of nine alternatives were initially developed in the FS for the sludge lagoon. Following the "initial screening" process, six alternatives were preserved for the detailed evaluation.

The sludge lagoon operated from 1968 to 1976 as a settling lagoon for the facility wastewater treatment system. At the time the lagoon was removed from service, as much as four feet of metal hydroxide sludges lined the bottom of the lagoon. Analyses of the sludge indicate that it mainly consists of phosphorus, aluminum, chromium, copper, nickel, iron and fluoride. Ground water monitoring data have determined that the metals have leached into ground water. Direct contact exposure to sludges and soils in the lagoon presents a potential human health risk as does ingestion of contaminated ground water resulting from leachate generation.

The objective as stated in the FS is to minimize contact with the contaminated sludges and soil and minimize contact with and prevent use of ground water. Table 5 presents the array of remedial alternatives evaluated.

TABLE 5

SLUDGE LAGOON REMEDIAL ALTERNATIVES

Alternative 1: No action.

Alternative 2: Cap the lagoon and monitor ground water.

Alternative 3: Solidify sludge, cap the lagoon and monitor ground water.

Alternative 4: Excavate and dispose of sludge off-site; pump and treat ground water.

Alternative 5: Excavate sludge and soil, beneath sludge, and dispose of off-site; pump and treat ground water.

Alternative 6: Excavate and dispose of sludge off-site and monitor ground water.

A detailed analysis of each alternative was conducted to evaluate 1) technical feasibility, 2) environmental and public health impact, 3) institutional issues, and 4) cost.

a. Alternative 1: No action.

Under the "no action" alternative, only land development restrictions would be implemented, and no other remedial work would be conducted. The existing site conditions would continue, such that the potential for exposure to contaminated sludge would remain, and contaminated

ground water would continue to be discharged, uncontrolled, into the LaCrosse River. This alternative would not be consistent with the requirements of the Resource Conservation and Recovery Act (RCRA) which necessitates that hazardous waste be removed at closure (clean closure) for a surface impoundment or properly capped and monitored for "in place" closure. Specifically, RCRA closure and post-closure requirements 40 CFR Part 264 Subpart G or the Wisconsin Department of Natural Resources (WDNR) (NR 181.42(8)) would not be satisfied by this alternative.

In addition, the RCRA 40 CFR Part 264 Subpart F (§264.92) ground water protection standard is not satisfied in that established cleanup levels (i.e. background, MCLs, or ACLs) are not met.

Consequently, this alternative is not considered appropriate for the sludge lagoon.

Cost estimates are not applicable to the "no action" alternative.

b. Alternative 2: Cap the lagoon and monitor ground water.

This alternative proposes the capping of the sludge lagoon to prevent contact with exposed contaminated sludge, and a ground water monitoring program to track ground water quality. The existing monitoring wells on-site would be utilized to monitor plume movement. Ground water samples would be taken and analyzed on a semi-annual basis.

Cap design and implementation are well established technologies that can be implemented with relative ease. In effort to prevent degrading of the cap, a long term maintenance program would be required to inspect for damage from erosion, invasive vegetation ponding, and settlement. The design and construction of the cap would meet the criteria of a cover system as described in and required by 40 CFR §264.310.

In consideration of environmental and public health impacts, this alternative would eliminate the possibility of human exposure to contaminated sludges and soils in the sludge lagoon. However, due to the sludge being located beneath the water table, capping may reduce leachate generation, but not eliminate it.

In this alternative, ground water contamination would continue to exceed ground water quality standards. Consequently, the use of alternate concentration limits (ACLs) is proposed as an appropriate and relevant requirement (ARAR). The criteria established in the Superfund Amendments and Reauthorization Act of 1986 (SARA) for the use of ACLs at Superfund sites (Section 121 (d)(2)(B)(ii)) are met at the NEC site, such that 1) there are known points of

entry of ground water into the LaCrosse River, 2) the EA demonstrates that there is no statistical increase of indicator compounds downstream from the discharge points in the river, and 3) institutional controls (ie. deed restrictions) will prevent human exposure to contaminated ground water between the sludge lagoon and the points of ground water discharge to the LaCrosse River (NEC owns the property up to the river).

The ACLs established for site contaminants will essentially be ground performance standards that will regulate ground water discharge and surface water quality. A discussion on how ACLs will be applied to the NEC site is found in Section VII(2) of this document.

This alternative satisfies RCRA closure and post-closure requirements (40 CFR Part 264 Subpart G) and state closure standards (NR 181.42(8)). The use of ACLs satisfies the RCRA ground water protection regulations in 40 CFR Part 264 Subpart F, specifically §264.94.

Cost estimates were based on initial capital costs, and annual operation and maintenance cost amoritized at 10 percent over a 30 year period.

Cost Estimate for Alternative 2

1.	Capital	$127,000
2.	Annual Operating	10,200
	-Present Worth ..... (30 yrs., 10% interest)	96,000
3.	Total Project Cost	$223,000

c. Alternative 3: Solidify sludge, cap the lagoon; monitor ground water.

This alternative proposes to solidify the sludge in the sludge lagoon in an effort to reduce contaminant mobility, in conjunction with providing a RCRA approved cap over the lagoon to further impede leachate generation. In addition, a ground water monitoring program would be implemented to track the plume and ensure performance of the remedy.

Sludge solidification is an established technology that has been implemented successfully on various types of waste composition. It has shown to be quite effective with metal hydroxide sludges, as those in the sludge lagoon. The solidification process would be accomplished in-situ employing the lagoon itself as a mixing pit. An appropriate solidifying agent would be injected into the sludge layer, then the sludge would be physically mixed through the use of a backhoe.

Once the sludges have set, a cap would be emplaced over the entire lagoon. A firm base for cap emplacement would be provided by the solidified sludges, enhancing the long-term integrity of the cap. A multilayered cap system would be designed for the lagoon. The cap would consist of an upper vegetative layer, underlain by a drainage layer that lies atop a synthetic liner. Beneath the synthetic liner, a layer of low-permeability material such a clay, would be emplaced. The cap would meet the criteria in 40 CFR §264.310 for cap design and construction.

A ground water monitoring program would be initiated to track the existing plume and to ensure that the remedy is performing adequately. Present ground water contamination at the site exceeds background levels and MCLs. Consequently, given the conditions at the site, ACLs would be applied to protect the river water quality, and used as ground water performance standards. Contaminants found in ground water are at trace levels in the LaCrosse River, in inconclusive differences exist between upstream and downstream concentrations. As stated in Alternative 2, the criteria established in SARA for the usde of ACLs is met at the NEC site. Refer to Section VII(2) of this document for the discussion of ACL application to the NEC site.

This alternative would provide more than adequate public health and environmental protection through elimination of direct human contact of sludges, reduction of leachate generation, semi-annual ground water monitoring, and the application of ACLs for plume management. Consequently, this alternative satisfies RCRA closure and post-closure requirements in 40 CFR Part 264 Subpart G and state closure standards (NR 181.42(8)). The use of ACLs satisfies the RCRA ground water protection regulations in 40 CFR Part 264 Subpart F, specifically §264.94.

Cost estimations for this alternative were based on initial capital expenses and annual operation and maintenance costs amortized at 10 percent over a 30 year period.

Cost Estimate for Alternative 3

1.	Capital	$169,000
2.	Annual Operating	10,200
	-Present Worth ..... (30 yrs., 10% interest)	96,000
3.	Total Project Cost	$265,000

d. Alternative 4: Excavate and dispose of sludge off-site; pump and treat ground water.

This alternative entails the complete excavation of sludge from the lagoon, and subsequent transport and disposal at a RCRA

permitted landfill. In addition, a ground water pumping and treatment system would be implemented. An estimated 1500 cubic yards of sludge would be removed from the lagoon and disposed. Contaminated ground water at the site would be extracted and treated in a precipitation/flocculation unit for the removal of metals, and then discharged into the LaCrosse River.

Sludge excavation is proven technology that could be undertaken with relative ease at the sludge lagoon. A three-quarter cubic yard drag line would be used to undertake the excavation due to the excessive moisture of the sludge. Approximately two weeks would be necessary to complete the sludge removal.

On-site ground water extraction and treatment systems have shown repeated success in application at contamination sites. However, the FS has identified a potential problem in implementation of the ground water extraction system near the sludge lagoon. Capture wells would be located hydraulically downgradient from the lagoon, which would place the wells within 150 feet of the LaCrosse River. The stated concern is that a pumping scheme could possiblly draw a significant amount of river water into the system, which would significantly lengthen the period of performance of the extraction and treatment system. An estimated 15 to 30 years would be required to reduce the metals concentration to background. As a result, the total project cost would be quite onerous in comparison to other alternatives that achieve similar environmental and public health benefits.

In analyzing the degree of environmental and public health protection of this alternative, consideration must be given to the conclusions of the EA. In regard to ground water contamination, although the cumulative cancer risk through ingestion of ground water exceeds the 1×10^{-6} value, the possibility of this actually occurring appears quite remote. No industrial, private, or public water supply's are located downgradient from the lagoon to the LaCrosse River. Land development restrictions would preclude the future use of the property for water well construction. Presently, the only scenario that would result in exceeding the 1×10^{-6} cancer risk would be through the unlikely possibility of an individual ingesting two liters of water per day from the most contaminated monitoring well for a lifetime.

The EA states that inconclusive differences exists between upstream and downstream concentrations of contaminants, indicating little or no apparent present impact to surface water quality from the NEC site. Consequently, little environmental or public health benefit would be derived from a ground water pumping and treatment system. The cost of such a system would be onerous in comparison to alternatives that achieve similar benefits.

Regarding the excavation of sludge from the sludge lagoon, the EA concludes that direct contact to the contaminated sludge and soil does indeed present a public health threat, and should be prevented through implementation of a remedial action. Direct contact with the sludge and soil, however, can be precluded through other effective means (i.e. capping/ solidification) without the burdensome costs of off-site transportation and disposal of the sludge material. In addition, the off-site transport and disposal of waste is the least preferred of possible remedies, as stated by SARA, where practicable treatment technologies exist. As indicated, Alternative 3 of this alternatives array provides on-site treatment (sludge solidification) which achieves similar environmental and public health benefits without the use of off-site disposal.

Consequently, although this alternative satisfies RCRA closure and post-closure requirements in 40 CFR Part 264 Subpart G and state closure standards (NR 181.42(8)), it is not considered cost effective for the sludge lagoon when compared to other alternatives that achieve the same objectives.

Cost estimates are based on initial capital expenses and annual operation and maintenance cost amortized at 10 percent over a 30 year period.

Cost Estimate of Alternative 4

1.	Capital	$ 779,000
2.	Annual Operating	66,000
	-Present Worth ..... (30 yrs., 10% interest)	622,000
3.	Total Project Cost	$1,401,000

e. Alternative 5: Excavate sludge and soil beneath sludge and dispose of off-site; pump and treat ground water.

This alternative is different from Alternative 4 only in respect to the removal of contaminated soil beneath the sludge in addition to the sludge. All excavated material would be sent off-site to a RCRA permitted landfill, and a ground water pumping and treatment system would be implemented.

The discussion of this alternative basically mirrors that of Alternative 4. The same advantages and disadvantages exist for both alternatives. The only added benefit of this alternative would be the additional removal of contaminated soil beneath the sludge, which would provide a greater degree of confidence in source control.

This alternative, as in Alternative 4, satisfies RCRA closure and post-closure requirements 40 CFR Part 264 Subpart G and state closure standards (NR 181.42(8)), however, as a result of the same issues and concerns stated in Alternative 4, this alternative is not considered applicable for the sludge lagoon.

Cost estimations are based on initial capital expenses and annual operation and maintenance cost amortized at 10 percent over a 30 year period.

Cost Estimate of Alternative 5

1.	Capital	$ 984,000
2.	Annual Operating	66,000
	-Present Worth ..... (30 yrs., 10% interest)	622,000
3.	Total Project Cost	$1,606,000

f. Alternative 6: Excavate and dispose of sludge off-site; monitor ground water.

This alternative proposes the removal of all sludges from the lagoon, and to transport and dispose of at a RCRA permitted landfill. In addition, a ground water monitoring program would be instituted using the existing site monitoring wells.

Sludge excavation would be undertaken through use of drag-line type equipment. Conventional earth-moving equipment would not be employed due to the difficulties in handling very moist sludge. The use of drag-line equipment is a well established technology with a proven history in conditions such as those that exist in the sludge lagoon.

The excavation of sludge through this remedy would effectively eliminate the source of contamination; however, the present ground water contamination would continue to exceed ground water quality standards. As a result, ACLs are proposed to be applied as site specific ground performance water standards. Refer to Section VII(2) of this document for the discussion of ACL application to the NEC site.

A ground water monitoring program to be developed in the remedial design phase would be implemented to track and monitor the existing plume and ensure performance of the remedy.

This alternative, would satisfy RCRA ground water protection requirements in 40 CFR §264.92, RCRA closure and post-closure requirements in 40 CFR Part 264 Subpart G and state closure standards (NR 181.42(8)).

Although this alternative would satisfy federal and state closure standards, it has been rejected as a possible remedial alternative. As indicated in other alternatives that propose off-site disposal, SARA mandates that "off-site transport and disposal without treatment is the least preferred option where practicable treatment technologies are available." And furthermore, SARA establishes a preference for remedial actions that utilize treatment to permanently and significantly reduce the volume, toxicity, or mobility of hazardous substances. In light of these stated preferences, this alternative does not satisfy either of the two. By comparison, Alternative 3 of this array does meet the preference for treatment through use of sludge solidification, which will significantly reduce the mobility of the metal hydroxide sludges.

Alternative 6 provides no greater environmental or public health benefit than does Alternative 3. Both alternatives meet the stated remedial action objectives. This alternative meets the objectives through elimination of the leachate source and the potential of direct human contact. Alternative 3 achieves the objectives through plume management and the capping and solidification of the lagoon. Aternative 3 does, however, provide a considerable cost savings over Alternative 6.

Cost estimates for this alternative are based on initial capital expenses and annual operation and maintenance costs amortized at 10 percent over a 30 year period.

Cost Estimate of Alternative 6

1.	Capital	$377,000
2.	Annual Operating	8,000
	-Present Worth ..... (30 yrs., 10% interest)	76,000
3.	Total Project Cost	$453,000

2. Drainage Ditch Alternatives Array

A total of five remedial alternatives were developed in the FS for the drainage ditch. Following the "initial screening of alternatives", four alternatives remained for the detailed analysis.

The drainage ditch was employed to convey treated effluent from the sludge lagoon, during the operating years, to a storm runoff ditch where it combined with the City of Sparta's wastewater effluent prior to discharge into the LaCrosse River. Field investigations have revealed elevated levels of fluoride, copper, zinc and nickel in the surface soil of the ditch.

The objective of the remedial action, as stated in the FS, is to minimize the potential for contact with contaminated soil in the drainage ditch. Table 6 presents a summary of remedial alternatives for the drainage ditch.

TABLE 6

Drainage Ditch Remedial Alternatives

Alternative 1:	No action
Alternative 2:	Access restriction through installations of a fence.
Alternative 3:	Excavate contaminated drainage ditch soil and place in sludge lagoon.
Alternative 4:	Excavate contaminated drainage ditch soil and dispose off-site.

The FS conducted a detailed analysis and evaluation of each alternative based on the following parameters: 1) technical feasibility, 2) environmental and public health impact, 3) institutional issues, and 4) cost.

a. Alternative 1: No action.

The "no action" alternative would be limited to only land development restrictions, no remedial work would be conducted at the drainage ditch.

The EA states that exposure to contaminated soil in the drainage ditch poses a human health risk. This alternative does nothing to provide source control to alleviate public health risks. RCRA requirements necessitate that hazardous waste and residuals be removed at closure or capped and monitored "in place". Consequently, this alternative does not satisfy RCRA closure and post-closure requirements in 40 CFR Part 264 Subpart G or state closure standards (NR 181.42(8)).

Cost analyses are not applicable for the "no action" alternative.

b. Alternative 2: Access restriction.

This alternative entails the construction of an eight foot high barbed wire chain-link fence around the drainage ditch area. A locked entrance gate would restrict access to the site to only authorized personnel. The FS indicates that approximately 150 feet of fencing around the area would be required.

The fence would remain as a permanent feature around the drainage ditch and would require periodic maintenance.

The contaminated soil would remain in the ditch, however, the fence would reduce the likelihood of casual human contact with the soil. The threat of contact would still persist with this alternative due to the continued presence of contaminated surface soil.

Consequent to the continued threats to ground water and the potential direct human contact risk, this alternative would not meet the RCRA closure and post-closure requirements 40 Part CFR 264 Subpart G or state closure standards (NR 181.42(8)).

The cost estimate for Alternative 2 is based solely on initial capital costs for implementation. No substantial maintenance or long-term costs are associated with this alternative.

Cost Estimate for Alternative 2

Total Project Cost $3,000
(fence construction)

c. Alternative 3: Excavate contaminated drainage ditch soil and place in sludge lagoon.

This alternative proposes to remove all contaminated soil in the drainage ditch area and placement in the "sludge lagoon" for closure. This alternative assumes that the "sludge lagoon" will be capped as described in Alternative 2 or Alternative 3 of the "sludge lagoon alternatives array".

Soil excavation is a well established technology with a proven history of success. A backhoe would be employed to conduct the soil excavation and clean soil material will be used for backfill to restore the excavation area to its previous contour.

Removal of the contaminated soil would eliminate any possibility of human contact and decrease the areal extent of surface contamination thus achieving the desired affect of the remedial action objective. This alternative would only be implemented if capping of the sludge lagoon were approved (i.e. sludge lagoon Alternative 2 or 3). The addition of this material to the lagoon would not exacerbate the conditions in the sludge lagoon.

Contaminated soil removal from the drainage ditch would satisfy RCRA closure and post-closure requirements 40 CFR Part 264 Subpart G and state closure standards (NR 181.42 (8)).

The cost estimation for this alternative is based solely on initial capital costs for implementation, no maintenance or long-term costs are associated with this alternative.

Cost Estimate for Alternative 3

Total Project Cost $2,500

d. Alternative 4: Excavate contaminated drainage ditch soil and dispose of off-site.

This alternative entails the excavation of contaminated soil, and subsequent disposal at an off-site RCRA permitted landfill. This remedy is identical to Alternative 3 with the exception that soils are disposed of off-site as opposed to in the sludge lagoon.

As with Alternative 3, this alternative would eliminate the threat of any exposures with contaminated soil in the drainage ditch.

As a result, this alternative satisfies the requirements of RCRA closure and post-closure requirements in 40 CFR Part 264 Subpart G and state closure standards (NR 181.42 (8)).

In consideration to the preference of SARA, which states that off-site disposal of waste is the least preferred alternative where practicable treatment technologies exist, this alternative is rejected in favor of Alternative 3 which, employs the use of sludge solidification to significantly reduce the mobility of the waste in the lagoon aiding in the long-term performance of the remedy.

Cost estimates for this alternative are based solely on initial capital costs, no long-term maintenance or operation costs are applicable.

Cost Estimate of Alternative 4

Total Project Cost $11,000

3. Sludge Dump Site Alternatives Array

A total of seven remedial alternatives were developed in the FS for the sludge dump site. Following the "initial screening of alternatives" four remained for the detailed analysis.

The sludge dump contains material that was excavated from the sludge lagoon during its period of operation. Currently, no

ground water contamination has been attributed to the sludge dump site. Approximately 930 cubic yards of combined sludge and soil were buried in the dump, and, presently, two feet of soil covers the sludge dump site.

The remedial action objective is to reduce or minimize the threat of contact exposure with the sludge. Table 7 presents the list of alternatives for remedial action.

TABLE 7

SLUDGE DUMP SITE REMEDIAL ALTERNATIVES

Alternative 1:	No action
Alternative 2:	Cap dump site
Alternative 3:	Excavate sludge for off-site disposal
Alternative 4:	Excavate sludge and soil for off-site disposal

The FS conducted a detailed analysis and evaluation of each alternative based on the following perameters: 1) technical feasibility, 2) environmental and public health impacts, 3) institutional issues, and 4) cost.

a. Alternative 1: No action.

The "no action" alternative involves only the implementation of land development restrictions, no remedial work would be conducted.

Due to the existence of two feet of soil cover over the sludge dump, the chance of casual human contact exposure is remote. Construction, as the result of property development, would be the most likely scenario in which an exposure event could occur. Development restrictions attached to the property deed would preclude this from occuring.

The potential for ground water contamination remains a threat with this alternative due to the continued existence of the waste, although presently, no ground water contamination has yet been attributed to the sludge dump.

RCRA closure requirements would not be met with this alternative. Specifically, 40 CFR Part 264 Subpart G which requires that post-closure ground water monitoring be undertaken at the site

following closure of the unit. Similarly, Wisconsin Department of Natural Resources requirements for long term care, including monitoring, of landfills and surface impoundments (NR 181.42(9)) would not be satisfied. Consequently, this alternative is not considered applicable for the sludge dump.

Cost estimations are not applicable to this alternative.

b. Alternative 2: Capping of the sludge dump.

This alternative proposes the capping of the sludge dump site, which would further reduce the likelihood of casual human contact with contaminated soil and sludge (in comparison to the "no action" alternative), and would also minimize future leachate generation into ground water.

Capping is well proven technology and could be easily implemented at the site. A cap could be designed and implemented with relative case at the sludge dump site. Design details of the cap would provide for proper lining material, erosion control, drainage, and long-term maintenance. Land development restrictions would preclude activities that could potentially damage the cap.

As in Alternative 1, this alternative does not provide for post-closure ground water monitoring as required by 40 CFR Part 264 Subpart G. Post-closure monitoring is a relevant and appropriate requirement as a result of "in place" closure of the sludge dump. Similarly, state post-closure monitoring requirements (NR 181.42(9)) would
not be satisfied. Consequently, this alternative is not considered applicable for the sludge dump.

Cost estimates include initial capital costs, and annual operation and maintenance cost amortized at 10 percent over a 30 year operating period.

Cost Estimate of Alternative 2

1.	Capital	$23,000
2.	Annual Operating	500
	-Present Worth ..... (30 yrs., 10% interest)	5,000
3.	Total Project Cost	$28,000

c. Alternative 3: Excavation of sludge and dispose off-site.

This alternative proposes complete removal of sludge from the dump site. An estimated 900 cubic yards of sludge would be

excavated from the dump and transported and disposed of at a RCRA permitted landfill. The dump site would be backfilled with native soil following excavation to its former grade.

The excavation and backfilling would be undertaken with conventional earth moving equipment (i.e. front-end loader and backhoe). It would take approximately one month to complete the project.

The removal of the sludge (not including residual contaminated soil) from the sludge dump area would all but eliminate the probability of human contact with contaminated material, and significantly reduce the likelihood of leachate generation into ground water.

This alternative would satisfy RCRA closure and post-closure requirements in 40 CFR Part 264 Subpart G and state closure standard (NR 181.42(8)) through minimization of human health risks.

As indicated in Alternative 4 of the "drainage ditch alternatives array", off-site disposal of waste is the least preferred alternative where practicable treatment technologies exist. In this case, other alternatives exist that provide essentially the same environmental and public health benefits, such as Alternatives 1 and 2, at a significantly lower cost without employing off-site disposal. Consequently, this alternative is not considered applicable to the sludge dump site.

Cost estimates are based solely on capital cost (i.e. excavation, transportation and disposal), annual operation and maintenance cost are not applicable.

Cost Estimate of Alternative 3

Total Project Cost $179,000

d. Alternative 4: Excavation of sludge and soil and disposal off-site.

This alternative is the same as Alternative 3 except for the addition of removal of contaminated soil beneath the sludge. An estimated 1,400 cubic yards of combined sludge and soil would be excavated and removed off-site.

As in Alternative 3, excavation and backfilling would be undertaken with conventional earth moving equipment. The excavated sludge and soil would be transported and disposed of in a RCRA permitted landfill.

This alternative provides a greater degree of assurance in complete contaminant removal from the sludge dump site than does Alternative 3. It reduces or eliminates altogether the threat of ground water contamination from leachate generation.

This alternative would satisfy RCRA closure and post-closure requirements 40 CFR Part 264 Subpart G and state closure standards (NR 181.42 (8)) through complete removal of contaminated material from the sludge dump.

As stated in previous alternatives that propose off-site disposal, off-site disposal is considered the least preferred alternative where other alternatives exists that employ treatment technologies that permanently and significantly reduce volume toxicity or mobility of hazardous substances. In this situation there are other alternatives (Alternatives 1 and 2) that achieve the same level of protectivenss without the use of off-site disposal and, in addition, at a significantly lower cost. Consequently, this alternative is not considered applicable at the sludge dump site.

Cost estimations are based solely on capital costs (i.e. excavation, transportation, and disposal). Annual operation and maintenance costs are not applicable.

Cost Estimate of Alternative 4

Total Project Cost $274,000

4. Seepage Pit Alternatives Array

A total of five remedial alternatives were developed for the seepage pit. Following the "initial screening of alternatives", four remained to be evaluated in the detailed analysis.

The seepage pit was removed from operation in 1976, and eventually backfilled with 15 feet of clean fill in 1981. A number of chlorinated volatile organics and heavy metals have been detected in monitoring wells downgradient from the the seepage pit. The seepage pit continues as a suspected source of ground water contamination. Soil samples have revealed elevated levels of fluoride, aluminum, chronium and copper. No sludge was encountered during the field investigations of the seepage pit. The primary route of exposure would be through ground water ingestion. Contact with contaminated soil is considered an unlikely exposure scenario.

The remedial action objective is to minimize human contact with contaminated soil, and to eliminate or reduce the threat of

exposure to contaminated ground water. Table 8 presents a summary of preliminary alternatives for remedial action.

TABLE 8

Seepage Pit Remedial Alternatives

Alternative 1:	No action.
Alternative 2:	Excavation of soil for off-site disposal.
Alternative 3:	Access restrictions and ground water monitor.
Alternative 4:	Excavation of soil for off-site disposal; pump and treat ground water.

The FS evaluated each alternative based on the following preameters: 1) technical feasibility, 2) environmental and public health impacts, 3) institutional issues, and 4) cost.

a. Alternative 1: No action.

In the "no action" alternative, only land development restrictions would be obtained, no rememdial works would be conducted. This alternative would do nothing to cease, reduce, or monitor the continued release of contaminants into ground water by the seepage pit.

RCRA ground water protection requirements 40 CFR §264.92, necessitating ground water cleanup to background, MCLs, or ACLs, would not be satisfied.

RCRA closure and post-closure requirements 40 CFR Part 264 Subpart G and state closure standards (NR 181.42 (8)) would not be satisfied with this alternative. Consequently, the "no action" alternative is not considered applicable for the seepage pit.

Cost estimates are not applicable in this alternative.

b. Alternative 2: Excavation of soil for off-site disposal.

This alternative proposes the complete removal of contaminated soil in the seepage pit (no sludge exists). This would effectively remove the source of ground water contamination and allow for future land development at the site.

Contaminated soil would be transported to and disposed of at a RCRA permitted landfill. Clean fill material would be used for backfilling following the excavation. The total project would take approximately one month to complete.

The technology of soil excavation is well established and could be undertaken with relative case at the seepage pit. Conventional earth moving equipment (i.e. front-end loader and backhoe) would be employed to undertake and complete the project.

Excavation of contaminated soil would effectively eliminate or significantly reduce the source of ground water contamination.

However, groundwater at the facility is presently contaminated with VOC's at levels above either background or MCLs. This alternative does little to return ground water quality to acceptable levels. As a result the RCRA ground protection requirements in 40 CFR §264.92 would not be met by this alternative.

Consequently, this alternative is not considered applicable for the "seepage pit".

The cost estimate was based solely on capital costs (i.e. excavation, transportation and disposal). Annual operation and maintenance costs are not applicable.

Cost Estimate for Alternative 2

Total Project Cost $77,000

c. Alternative 3: Site access restriction; monitor ground water.

This alternative would employ the use of land development restrictions in the property deed to minimize the potential of human contact with contaminated soil and ground water. In addition, a ground water monitoring program would be developed and implemented to identify any changes in ground water quality. Monitoring would be conducted on a semiannual basis for an initial 5 year period, at which time, an assessment would be conducted to determine future sampling requirements.

This alternative proposes the development of alternate concentration limits (ACL) as site specific ground water quality standards for VOCs. Ground water contamination would continue to exist with this alternative. However, because no adverse environmental or public health impact exists, the use of ACLs is appropriate for plume management. The ACLs would be used as action levels, to

protect the surface water quality adjacent to the site from further degradation. If exceded a corrective action response would be initiated.

The groundwater situation meets the established criteria for applicability of ACLs in both SARA (Section 121(d)(2)(B)(ii) and RCRA (40 CFR §264.92). Refer to Section VII(2) of this document for the discussion of ACL application to the NEC site.

Contamination that emanates from the seepage pit travels through two routes of exposure; ground water and, subsequently, surface water. This alternative precludes direct ingestion of ground water through the use of land development restrictions, which would disallow the construction of water wells at or downgradient of the seepage pit. Surface water would be protected through the application of ACLs at the site. LaCrosse River water has revealed trace amounts of trichloroethylene upstream and downstream of the NEC facility. Trichloroethylene is the only VOC detected in the in the river at concentrations well below the maxium acceptable level set for aquatic life. As a result, the quality of surface water is not presently adversely impacted by the seepage pit.

Consequent to the employment of land development restrictions, ground water monitoring, and the use of ACLs; RCRA ground water requirements (40 CFR §264.92), RCRA closure and post-closure requirements 40 CFR Part 264 Subpart G and state closure standards (NR 181.42(8)) would be satisfied with this alternative.

Cost estimates are based solely on an amortized 10 percent 30 year operating and maintenance expenditure.

Cost Estimate for Alternative 3

Total Project Cost $55,000

d. Alternative 4: Excavation of soil for off-site disposal; pump and treat ground water for volatile organics.

This alternative proposes the excavation of contaminated soil from the seepage pit and the transport to and disposal of at a RCRA permitted facility. In addition, a pumping and treatment of ground water program would be initiated for the removal of volatile organic compounds (VOC's).

Soil excavation would be undertaken with conventional earth moving equipment (i.e. backhoe and front-end loader). The excavated area

would be backfilled and graded to its previous contour. Approximately one month would be necessary to complete the excavation and backfilling. The excavated soil would be tested for EP toxicity, and if necessary, the soil would be disposed of in a RCRA permitted landfill.

The ground water pumping and treatment system would involve the installation of extraction wells installed south of the sludge lagoon and north of the LaCrosse River. The treatment system would consist of an air stripping unit to remove VOCs, effluent would be discharged into the LaCrosse River.

As stated in previous alternatives that propose ground water pumping, the proximity of extraction wells to the LaCrosse River would induce a significant volume of river water into the pumping and treatment system. This would reduce the effectiveness of plume control, and significantly lengthen the period of performance of the system, which would appreciably inflate the cost of the remedy.

Although this alternative satisfies RCRA closure and post-closure requirement in 40 CFR Part 264 Subpart G and state closure standards (NR 181.42 (8)), it is not considered suitable for the seepage pit. The conditions at the site, such as they are, allow for the existence of elevated levels of VOC's without adversely impacting public health or the environment, as stated in the EA. The use of ACL's at the site has been deemed appropriate for plume management. In light of this, a ground water treatment program would do little to improve an already acceptable condition at the site. Furthermore, the concern of whether a technically effective and efficient ground water extraction system can be implemented has been acknowledged to potentially lengthen the period of performance of the remedy and inflate the overall cost.

Cost estimates for this alternative are based on initial capital expenses and annual operation and maintenance costs amortized at 10 percent over a 30 year period. Disposal costs were based on quoted estimations from Chemical Waste Management, Inc. (Fort Wayne, Indiana facility - Adam Center).

Cost Estimates for Alternative 4

1.	Capital Costs	$149,200
2.	Annual Operating	54,500
	-Present Worth ..... (30 yrs., 10% interest)	514,000
3.	Total Project Cost	$646,000

VII. Selected Remedies

The "alternatives array evaluation" analyzed, separately, the four discrete areas of contamination on the NEC site, those being the sludge lagoon, the drainage ditch, the sludge dump site, and the seepage pit. As a result of the previously described "alternatives evaluation", a remedy was choosen for each discrete waste unit on-site. All the sludges on-site will be solidified in the sludge lagoon for "in place" closure. Both the sludge dump site and the drainage ditch will be "clean closed" resulting from total removal of hazardous waste materials and residuals. A description of each selected remedy and rationale for selection will be discussed in the ensuing section.

1.) Source Control

a.) Sludge Lagoon

The contaminated sludge and soil in the sludge lagoon will be solidified, and a RCRA cover installed atop the lagoon to minimize leaching of contaminants into ground water and health risks related to direct contact with the sludge and soil.

Approximately, 3000 cubic yards of contaminated sludge and soil will be solidified in-situ using the existing lagoon as a mixing unit and final site for placement. An appropriate solidifying reagent will be added to the lagoon through either pneumatic or mechanical means. Mixing of the reagent will be accomplished with a backhoe or a dragline.

The solidification process is a widely practiced method to convert waste material into a solid state mass for reduced leachability. The waste in the sludge lagoon is in the form of metal hydroxide sludges, which are particularly amenable to solidification processes. Reagents such as Portland cement and pozzolan materials will be used to produce a waste/concrete composite. The strength and bearing capacity of the solidified waste will be of such a nature to support the weight of a RCRA cover.

Once the solidification process has been completed, a cover will be emplaced over the lagoon. The cover will serve primarily two functions; first, it will minimize infiltration and percolation providing ground water protection, and, second, it will minimize the potential for direct contact with contaminated sludge and

soil. The cover will be designed and constructed to meet RCRA requirements in 40 CFR §264.310 that specifies that a final cover must:

1. Provide long term minimization of migration of liquids through the closed impoundment.

2. Function with minimum maintenance.

3. Promote drainage and minimize erosion or abrasion of the cover.

4. Accommodate settling and subsidence so that the cover's integrity is maintained.

5. Have a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present.

Post-closure activities will be necessary to ensure the long-term performance of the remedy. Ground water monitoring, site inspections, and site maintenance will be performed as relevant post-closure requirements. Table 9 presents the cost estimations for the sludge lagoon remedy.

b.) Drainage Ditch

The contaminated soil in the drainage ditch will be excavated and solidified in the sludge lagoon to minimize health risks associated with direct contact with the soils.

The total amount of affected soil to be excavated will be determined through field sampling during the remedial design phase. The excavated soils will be solidified in conjunction with the sludges and soils presently in the sludge lagoon. The contaminants identified in the soils of the drainage ditch are essentially identical to those found in the sludge lagoon. The solidification process and subsequent capping and post-closure of the sludge lagoon are described in the sludge lagoon selected remedy.

The EA determined that the surface soils in the drainage ditch present a potential health risk to both adult and child populations coming into direct contact. Exposure to contaminated soil can occur through dermal absorption and ingestion. The selected remedy eliminates any potential contact with the contaminated soil in the drainage ditch.

Post-excavation sampling of the drainage ditch will ensure that contamination no longer exists. Soils analysis must show contaminants to be below compound detection limits for the drainage ditch to be considered clean. Once this criteria for cleanup

has been met, RCRA post-closure monitoring and care will not be considered an applicable or relevant and appropriate requirement. Table 10 presents the cost estimates for the drainage ditch remedy.

c.) Seepage Pit

Land development restrictions will be implemented at the seepage pit to minimize the potential of direct contact with contaminated soils. Long term ground water monitoring will be conducted to track changes in ground water quality relative to RCRA ground water protection standards.

Contaminated soils in the seepage pit exist approximately fifteen feet below grade. Exposures are considered possible through ingestion of contaminated ground water and soil, and dermal absorbtion of contaminated soil.

Future land development at the seepage pit will explicitly be restricted and reflected in the property deed. The deed will indicate the presence of hazardous materials on the property and disallow construction of water wells or building construction atop the seepage pit.

A newly constructed cover over the seepage pit may be necessary if the present cover does not meet the requirements of landfill covers found in 40 CFR §264.310. The present cover must demonstrate that its permeability is less than or equal to the permeability of any bottom liner system or natural sub-soils present, and that the cover promotes drainage with a minimization of erosion or abrasion. Should the present cover not meet these objectives or any other criteria set forth in 40 CFR §264.310, modifications will be made to the cover as necessary. Analysis of the cover's character will be conducted during the remedial design phase.

Long-term maintenance and periodic inspections of the cover will be performed as relevant post-closure requirements for the seepage pit. Quarterly ground water monitoring will be undertaken as a post-closure activity.

Table 11 presents the cost estimates for the seepage pit remedy.

d.) Sludge Dump Site

Contaminated sludge and soil in the sludge dump will be excavated and solidified in the sludge lagoon. This will effectively minimize the migration of contaminants into the ground water and any risks associated with direct contact of the sludges and soils.

The selected remedy for source control involves the excavation of approximately 1400 cubic yards of combined soil and sludge. The material will be placed in the sludge lagoon and solidified as described in the sludge lagoon selected remedy. The site will be backfilled and graded with native soils to its previous contour.

Post-excavation sampling will be conducted to ensure that contaminants no longer exist in the sludge dump. For the sludge dump to be considered clean, soils analysis must demonstrate that contaminants are below compound detection limits. Once this determination has been made, RCRA post-closure monitoring and care will not be considered an applicable or relevant and appropriate requirement.

Table 12 presents the cost estimates for the sludge dump remedy.

TABLE 9

SLUDGE LAGOON SELECTED REMEDY COST SUMMARY

SLUDGE SOLIDIFICATION, COVER LAGOON, AND MONITOR GROUND WATER

I.)	Initial Capital Cost	
	Remove & Replace Fence	$ 2,000
	Stabilize Sludge	35,000
	Borrow Fill	49,000
	Lagoon Cap	26,000
	Topsoil & Seed	11,500
	Construction Subtotal	$123,500
	Contingencies @ 25%	30,500
	Construction Total	$154,000
	Engineering & Legal	15,000
	Total Estimated Capital Cost	$169,000
II.)	Operation and Maintenance (O & M) Cost	
	Cap Maintenance Inspect & Maintain Cap	$ 2,000
	Groundwater Monitoring Labor	1,000
	Analyses, 6 wells, 4 times/yr @ $300/analysis	7,200
	Total Annual O & M Cost	$10,200
	Present Worth of O & M Cost ..... (30 years, 10% interest)	$96,000
III.)	Total Project Cost	$265,000

TABLE 10

DRAINAGE DITCH SELECTED REMEDY COST SUMMARY

REMOVE SOIL AND SOLIDIFY IN SLUDGE LAGOON

I.)	Initial Capital Costs	
	Excavation and Backfill	$1,400
	Topsoil & Seed	200
	Engineering	400
	Subtotal	$2,000
	Contingencies @ 25%	500
	Total	$2,500
II.)	Operation and Maintenance (O & M) Cost	
	Not Applicable	
III.)	Total Project Cost	$2,500

TABLE 11

SEEPAGE PIT SELECTED REMEDY COST SUMMARY

ACCESS RESTRICTIONS AND GROUND WATER MONITORING

I.) Operation and Maintenance (O&M) Cost

Groundwater Monitoring 4 wells, Quarterly Sampling @ $300/sample	$4,800
Labor	1,000
Total Annual Operating	5,800
Present Worth of Operating Cost ..... (30 years, 10% interest)	55,000

II.) Total Project Cost $55,000

Note: No intial capital costs associated with this alternative.

TABLE 12

SLUDGE DUMP SITE SELECTED REMEDY

EXCAVATE AND SOLIDIFY IN SLUDGE LAGOON

COST SUMMARY

I.) Initial Capital Cost

Excavation and Hauling	$9,000
Site Restoration	5,000
Engineering	5,000
Subtotal	$19,000
Contingencies @ 25%	5,000
Total	$24,000

II.) Total Project Cost $24,000

Note: No O&M cost associated with this alternative.

2.) Management of Migration

The source control remedies at the site call for the majority of on-site contaminated soils and sludges to be placed and solidified in the sludge lagoon, and the lagoon to be properly closed. The only remaining contaminated material outside the sludge lagoon will be the residual contaminated soil buried beneath the seepage pit. Ground water contamination is presently confined to a small area of land downgradient from the seepage pit and sludge lagoon. The seepage pit is located approximated 75 feet upgradient from the sludge lagoon. Ground water monitoring will be conducted downgradient of the sludge lagoon, and will intercept ground water from both the sludge lagoon and the seepage pit.

Contaminated ground water at the site currently presents little threat to pubic health or the environment. The long-term threat associated with the ground water is the potential impact to the LaCrosse River, where site ground water discharges. Site ground water monitoring and surface water protection will be managed through use of alternate concentration limits (ACLs) as ground water performance standards. Simply stated, the use of ACLs will prevent the further degradation of site ground water and protect LaCrosse River quality.

The use of ACLs at th NEC site will meet the RCRA ground water requirements in 40 CFR Part 264 Subpart F, and the criteria established in SARA Section 121(d)(2)(B)(ii) for application of ACLs. SARA stipulates that for ACLs to be employed at Superfund sites the following conditions must be met:

1.) There are known and projected points of entry of contaminated groundwater into surface water.

2.) There is no statistically significant increase of hazardous constituents from ground water into surface water at the point of entry or where there is reason to believe downgradient accumulation may occur.

3.) The remedial action includes enforceable measures to preclude human exposure between the facility boundry and points of entry into the surface water.

All three of these conditions are met at the NEC site. Direct exposure to contaminated ground water on-site will be precluded through the use of deed restrictions preventing water well construction over the contaminated area. NEC owns all the property over the contaminated groundwater up to the discharge point at the LaCrosse River.

Conceptually, plume management necessary to protect the LaCrosse River is based on the following two criteria:

1.) No statistically significant increase of contamination to the surface water will occur due to discharges from ground water at the site; and,

2.) No statistically significant exceedence of an Ambient Water Quality Criterion in the surface water will be allowed as a result of the ground water discharge.

The first criteria, which is the more stringent of the two, will be applied at the NEC site. As the site presently exists, satisfying the first criteria will more than satisfy the second requirement. This approach is considered highly protective of the LaCrosse River, in particularly in light of a 1500 to 1 dilution factor provided by the river.

Table 13 lists the indicator compounds used in the RI to characterize the nature and extent of site contamination, and, where they exist, their corresponding MCLs and/or chronic toxicity water quality criteria (WQC). The ACLs to be developed for the site will satisfy the appropriate WQC.

Table 13

Proposed ARAR Requirements †*

Target List of Compounds	MCL°	WQC●
1. Trichloroetheylene	5	21,900
2. Vinyl Chloride	1	N/V
3. 1,1 Dichloroethylene	7	N/V
4. 1,1,1 Trichloroethane	200	N/V
5. Trans 1, 2-Trichlorethane	N/V	N/V
6. Fluoride	4000	N/V
7. Copper	12	12+
8. Nickel	N/V	160+
9. Zinc	N/V	110+

† Compounds appear in micrograms per liter

* As of August, 1987; target list of compounds and values subject to change

° Maximum Contaminant level from Safe Drinking Water Act

● Ambient Water Quality Criteria For Long Term Protection Of Aquatic Life

+ Function of Water Hardness; Value Given for Hardness Measured at 100 mg/l

N/V = No Value

The mechanics of a ground water monitoring program will be specifically addressed in the remedial design (RD) phase of the project. However, the basic ground work for establishing an effective monitoring program will be described in the following discussion.

Initially, baseline groundwater quality levels will be developed to quantify present site contamination. These levels will be determined through sampling of compliance monitor wells for four consecutive quarters over a year's time. The monitoring wells used to determine and subsequently verify ground water quality will be located downgradient from the sludge lagoon and in direction of the river to which the plume discharges. The frequency, timing, and protocol will be developed in a Quality Assurance Project Plan (QAPP) with the objective of gatheriny representative data of ground water quality and its variation over a year's period. A statistical test which accounts for the variation of the data will be employed to measure compliance, and will be equivalent to or the same as the "Cochran's Approximation to the Behrens-Fisher Student's t-test provided in 40 CFR Part 264 Subpart F, Appendix IV. This test will be workable only if the approved sampling protocol and analysis are strictly adhered to.

After baseline water quality and its statistic is derived, subsequent compliance monitoring can be compressed to the baseline statistic. For subsequent monitoring events a new statistic can be developed and compared to the baseline statistic. If the new statistic exceeds the baseline statistic at the 95% confidence limit there is high probability that a statistically significant increase of a parameter(s) has ocurred. The statistics may apply to each compound on Table 13 or to the sum of the compounds or to both as described in the RD stage.

If any exceedance occurs which is statisfically significant at the 95% confidence limit, confirmation sampling and analysis will occur. If subsequent sampling confirms a statistically significant increase in the concentrations of the compounds of interest, a Remedial Action Plan (RAP) will be developed over a limited period of time as determined in the RD stage. While the RAP is being developed, monitoring at an increase frequency will occur. Based on the frequency of statistically significant increase of the concentrations of the parameters monitored in the ground water, EPA will make a decision regarding the need to implement a remedial action. This decision process will be delineated in the RD stage. At no time will discharges to the LaCrosse River exceed acute water quality criteria for the protection of aquatic life.

VIII. Statutory Determinations

1.) Protectiveness

The selected remedies at the NEC site satisfy the remedial objectives identified in the FS to minimize risks to public health and the environment. Currently, potential risks on-site result from direct contact exposure to contaminated sludge and soil and ingestion of contaminated ground water.

Contaminated soil occuring in the drainage ditch and contaminated soil and sludge in the sludge dump area will be excavated and solidified in the sludge lagoon. The sludge lagoon will be provided with a RCRA specified cover, and inspected and maintained for a 30 year period. The present cover over the seepage pit

will be evaluated to determine whether it meets the RCRA criteria for cover design, and any modifications necessary to bring it within the specifications will be conducted.

These remedial measures will effectively minimize the risks of direct human contact with the contaminated sludge and soil. In addition to these measures, deed restrictions will be imposed on the property to prevent construction atop or into the impoundments.

Ground water contamination at the site will be managed through the use of alternate concentration limits (ACLs) as site specific ground water performance standards that are protective of the river. The current state of ground water contamination at the site presents little or no threat to public health or the environment. As demonstrated in the EA, the only possible scenario for attaining the 1×10^{-6} cancer risk value on-site would be through ingestion of two liters per day of ground water for a lifetime from the most highly contaminated monitoring well, which is considered hypothetically by presenting an unlikely exposure event. The property on which ground water contamination exists is not used for private, municipal, or industrial water supplies.

Ground water at the site discharges into the LaCrosse River. The EA has shown that inconclusive differences exist between upstream and downstream concentration of contaminants. This will be further tested in the RD on the site. In addition, the EA also concludes that the current level of contaminants in both sediments and surface water of the LaCrosse River does not present an adverse exposure risk to either humans or aquatic species.

Consequently, present site conditions allow for the application of ACLs as described in SARA Section 121(d)(2)(B)(ii). Should an ACL be met or exceeded at any one of the compliance points within a prescribed statistical range, a more frequent monitoring

program will commence to confirm or reject the initial results. A response action will then be undertaken to return ground water quality to the accepted level (i.e. less than the ACLs). The use of ACLs will effectively manage site ground water contamination and minimize risks to public health and the environment.

2.) Consistency With Other Laws

Table 14 lists the applicable or relevant and appropriate federal and state requirements (ARARs) that are considered for the NEC site and satisfied through the selected remedies.

The sludge lagoon will be employed as final placement of contaminated materials from the drainage ditch and the sludge dump site. Several federal RCRA requirements are relevant and appropriate to the implementation of this remedy. The sludge lagoon cover must meet the criteria for landfill covers as described in 40 CFR §264.310. This regulation requires that covers minimize the migration of liquids through the cover, function with minimum maintenance, promote drainage and minimize erosion to the cover, accommodate settling and subsidence, and have a permeability less than or equal to the permeability of natural subsoils or bottom liner.

Post-closure monitoring and care of the sludge lagoon will be required as described in 40 CFR §264.117. This will require periodic inspections and maintenance of the cover, as well as implementation of a ground water monitoring program.

As required by 40 CFR Part 264 Subpart F, a ground water protection standard must be established when hazardous constituents enter the ground water. The constituents may not exceed the background concentrations, MCLs, or the established ACL at the point of compliance. At the NEC site, ground water compliance monitoring will be undertaken with the use of ACLs as ground water performance standards. Application of ACLs on-site will be conducted within the meaning and substance established in 40 CFR §264.94(b) and SARA Section 121(d)(2)(B)(ii).

The present ground water monitoring wells downgradient of the sludge lagoon and seepage pit will be employed as the compliance monitoring points for the ACLs.

The seepage pit must satisfy closure and post-closure requirements of 40 CFR Part 264 Subpart G. Specifically, the cover over the seepage pit must meet the criteria established in 40 CFR §264.310.

TABLE 14

NEC Selected Remedies' ARARs

I.) Federal Requirements	
A.) Closure and Post-Closure Requirements 40 CFR Part 264 Subpart G	
1.) Closure performance standard	§264.111
2.) Post-closure care	§264.117
3.) Capping	§254.228(a)
4.) Clean closure	§264.228(a)(1)
5.) In-place closure	§264.228(a)(2)
B.) Ground Water Protection 40 CFR Part 264 Subpart F	
1.) Groundwater protection standard	§264.92
2.) Alternate concentration limit	§264.94
II.) State of Wisconsin Requirements	
A.) Closure and Post-Closure Requirement	
1.) Closure	NR 181.42(8)
2.) Post-closure	NR 181.42(9)
B.) Ground Water Protection	NR 140

This requirement may necessitate modifications to the existing cover. Investigation of the present cover will be undertaken during the remedial design phase. Post-closure monitoring and care of the seepage pit will be undertaken as described in 40 CFR §264.117. This will require periodic inspections and maintenance of the seepage pit cover, as well as implementation of a ground water monitoring program. Ground water monitoring will be conducted as described above in the application of ACLs.

The drainage ditch and sludge dump site will be "clean closed" as provided in 40 CFR §264.228(a)(1). At which time, post-closure requirements will no longer be relevant and appropriate. Extensive post-excavation sampling will be undertaken at both the drainage ditch and sludge dump site. The analytical results must indicate non-detectable levels of indicator contaminants for the units to be considered "clean closed".

Two Wisconsin DNR requirements are considered applicable or relevant and appropriate to the NEC site. Ground water contamination at the site will be governed by Chapter NR 140 - Ground Water Standards, and closure and post-closure requirements will be applied as described in Chapter NR 181 Hazardous Waste Management (Surface Impoundment Closure Requirements).

Wisconsin DNR closure requirements are found in NR 181.42(8), which essentially mirrors the federal RCRA closure requirements in 40 CFR §264.111. The state closure requirements will be met for the sludge lagoon, seepage pit, drainage ditch, and sludge dump site as described above for RCRA closure requirement (40 CFR Part 264 Subpart G). Post-closure Wisconsin DNR requirements are described in NR 181.42(9), which necessitates the long-term care and monitoring of surface impoundments and landfills where hazardous materials are closed in-place. This requirement essentially mirrors the federal RCRA post-closure requirement in 40 CFR §264.117. The state post-closure requirements will be met for the sludge lagoon and seepage pit as described above for RCRA post-closure requirement (40 CFR Part 264 Subpart G). The drainage ditch and sludge dump site will be "cleaned closed", and not required to undertake post-closure monitoring activities.

NEC ground water contamination will conform and be regulated by Wisconsin DNR Chapter NR 140 (Ground Water Quality Standards). This requirement is similar to the federal RCRA requirements in 40 CFR §264.92. such that it specifically allows for the establishment of alternate concentration limits (ACLs). Consequently, with the application of ACLs at the NEC site, state ground water quality requirements (NR 140) will be satisfied.

3.) Rationale For Remedies Selection

The remedies selected for the NEC site represent the best balance of the criteria established for alternatives comparison. In addition, the selected remedies achieve the statutory preference for remedial actions to utilize treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances.

The four waste units on-site were analyzed separately in the "detailed evaluation" section of the FS. A remedy was selected for each unit based on the evaluation. Although the remedies per waste unit were selected individually, they are interdependent upon each other for implementation, and in achieving the desired remedial objective.

The following section describes, individually, the rationale for the selection of each of the four remedies in terms of the best combination of effectiveness, implementability, and cost, and, in addition describing how the remedy satisfies the statutory perference for treatment.

a.) Sludge Lagoon

A total of six alternatives were evaluated in the final "alternatives array" for the sludge lagoon. All but the "no action" alternative met the remedial objective of minimization of contact with the sludge and prevention of contact with and use of contaminated ground water. The "no action" alternative was rejected because it would be totally ineffective in protecting human health and the environment. The present site condition would continue, such that the threat of direct human contact with contaminated sludge and soil would remain, and ground water contamination would continue unmonitored. In addition, neither state and federal closure requirements, nor ground water quality standards would be met.

The remaining five alternatives meet the remedial objective. Alternative 2 proposes to cap the sludge lagoon and monitor ground water, this alternative was rejected because it failed to effectively control the source of ground water contamination, casting doubts on the lony-term reliability of the remedy. Furthermore, this remedy would not satisfy federal and state closure requirements that necessitate the need to control or minimize the post-closure escape of hazardous materials to the extent necessary to protect human health and the environment.

The remaining four alternatives essentially satisfy the comparison criteria of implementability and effectiveness to various degrees. The alternatives are as follows: Alternative 3 - solidify sludge, cap the lagoon, and monitor ground water (apply ACL

performance standards); Alternative 4 - excavate sludge and dispose off-site, and pump and treat ground water; Alternative 5 - excavate sludge and soil for off-site disposal, and pump and treat ground water; and, Alternative 6 - excavate sludge and dispose off-site, and monitor ground water.

Under Section 121 of SARA, it states that the off-site transport and disposal of hazardous materials without treatment is the least preferred option where practicable treatment technologies are available. In analyzing the remaining four alternatives, the statutory preference for utilizing treatment technologies was a primary decision making factor in additon to the cost of remedy implementation.

Of the remaining four alternatives, Alternative 3 is considered the most appropriate remedy, such that it satisfies the statutory preference for treatment through the use of sludge solidification that will permanently and significantly reduce the present leachability of the waste. Additionally, it is the least costly of the remaining alternatives.

Alternatives 4, 5 and 6 propose for source control, the off-site transport and disposal of sludge from the sludge lagoon without utilizing treatment. As stated above, SARA considers this the least preferred option where treatment technologies are available. The metal hydroxide sludges in the lagoon are innately immobile in a soils environment, the solidification of those materials will ensure the long-term effectiveness of source control. Alternative 3 provides for the utilization of treatment on-site that is a permanent solution, and is protective of human health and the environment.

Ground water contamination on-site exists only downgradient of the sludge lagoon over a relatively small area of land. The contamination as it exists presently is not threatening any public, private or industrial water supplies. The EA demonstrates that site ground water contamination is not presently adversely impacting the quality of the LaCrosse River. Consequently, the use of ACLs on-site as ground water performance standards, as Alternatives 3 and 6 propose, is considered an appropriate and effective measure to manage ground water in the long-term.

In short, based upon 1) the utilization of treatment technologies for leachibility reduction, 2) the long-term effectiveness in providing protection to human health and the environment, and 3) the cost savings relative to the remaining alternatives, Alternative 3 is considered the appropriate remedy for the sludge lagoon and management of site ground water contamination.

b.) Drainage Ditch

Contaminated soil in the drainage ditch presents a health threat to humans coming into direct contact. The remedial objective is to prevent human contact with the affected soil. Essentially four alternatives exists for possible remedy. The "no action" alternative does nothing to reduce or minimize the potential health risks. The drainage ditch would remain in it present condition with no controls over contaminant migration or direct human contact. In addition, this alternative does not comply with the relevant and appropriate federal and state closure requirements.

Consequently, the "no action" alternative was rejected as a possible site remedy for the drainage ditch.

The remaining three alternative satisfy the stated remedial objective. Alternative 2 proposes to restrict access to the area through construction of a fence around the drainage ditch. This alternative would reduce the likelihood of casual human contract, however, the degree of effectiveness over the long-term is questionable. The contaminated soils would still remain "in place" exposed to the surface, and over the long-term there would be no guarantee that such access restriction would be effective. This alternative does not satisfy the statutory perference for treatment of hazardous constituents to permanently and significantly reduce toxicity, mobility, or volume. In addition, Alternative 2 does not satisfy federal and state closure requirements to minimize or eliminate post-closure escape of hazardous constituents to the extent to protect human health and the environment. Consequently, this alternative was rejected as a possible remedy.

The two remaining alternatives essentially attain the same degree of effectiveness and implementibility for remedy at the drainage ditch. Alternative 3 proposes the excavation of contaminated soil and subsequent solidification in the sludge lagoon, and Alternative 4 calls for the off-site transport and disposal of contaminated soil. Alternative 3 is considered the most appropriate remedy for drainage ditch based on the following rationale. First, the remedy incorporates the use of treatment as a principle element. As described in the selected sludge lagoon remedy, solidification of the sludge lagoon will permanently and significantly reduce the leachibility of the hazardous constituents. Second, Alternative 3 does not employ the use of off-site disposal without treatment as does Alternative 4, which is considered the least preferred option as stated in SARA. And, third, both Alternative 3 and 4 are protective of human health and the environment, and satisfy applicable or relevant and appropriate federal and state requirement, however, Alternative 3 is an order of magnitude less in cost than Alternative 4.

In short, Alternative 3 provides the most cost effective means of remediating the drainage ditch contamination for the protection of human health and the environment in addition to satisfying the stated preferences of SARA.

c.) Seepage Pit

Contamination at the seepage pit is confined to residual soil contamination beneath the bottom of the pit and subsequent ground water contamination. The remedial objective is " to minimize contact with buried contaminated soils and prevent use of ground water." A total of four alternatives were analyzed in the final array to address the risk to human health and the environment.

The "no action" alternative allows the seepage pit to remain in its present condition. No controls over future usage of the pit would be implemented, in addition, future monitoring, maintenance and inspection of the seepage pit would not be undertaken. The "no action" alternative is rejected because of the following factors: 1) uncertainties of the long-term impact and consequences of the waste on public health and the environment; 2) it does not satisfy federal and state relevant and appropriate requirements; 3) it does not achieve the remedial objective; and 4) it does not comply with the statutory preference for remedies that utilize permanant solutions.

The remaining three alternatives meet the remedial objective for the seepage pit, and satisfy the relevant and appropriate state and federal requirements. Alternatives 2 and 4 entail the excavation of contaminated soil and transport and disposal off-site, Alternative 4 also includes implementation of a ground water pumping and treatment system. Alternative 3 involves the inspection of the present cover over the seepage pit to determine if modifications are necessary, obtaining deed restrictions on the property to preclude future land development, and implementing a groundwater monitoring program. Groundwater monitoring for this remedy would actually be undertaken downgradient to the sludge lagoon were ACLs would be applied.

The seepage pit poses two potential threats to human health and the environment. First, the direct human contact with contaminated soil, and second, the continuation as a source of ground water contamination. The contaminated soil in the seepage pit is buried beneath fifteen feet of soil, which realistically precludes casual human contact. Alternative 3 provides an effective means of further ensuring and minimizing the potential of direct contact without employing off-site disposal.

In summary, Alternatives 2 and 4 were rejected in favor of Alternative 3 for the following two reasons. Alternative 3 meets the

remedial objective and satisfies the federal and state relevant and appropriate requirements at a cost less than either Alternative 2 or 4; and Alternative 3 provides effective means of more than adequately protecting human health and the environment without utilizing off-site transport and disposal, as do Alternatives 2 and 4.

Treatment technologies were screened out in the FS prior to the "detailed evaluation of alternatives" for the seepage pit, due to conditions surrounding the pit. Treatment technologies are considered impracticable, and a costly and inefficient means of remediating the site for the following reasons. First, the contaminated soils beneath the seepage pit are fifteen feet below grade and realistically presents no threat of human contact. Second, the contaminated soils are within the water table and are not a source of further degradation of water quality. Finally, the management of ground water through the application of ACLs has been deemed appropriate given the conditions at the site and the negligible effect on surface water. The seepage pit is approximately seventy-five feet hydraulically upgradient from the sludge lagoon, ground water compliance monitoring points for the seepage pit will be conducted downgradient from the sludge lagoon.

Consequently, the seepage pit presents little endangerment as it presently exists, warranting minimal remedial action to appropriately address the pit.

d.) Sludge Dump Site

The remedial objective at the sludge dump is to minimize contact with the buried sludge. No ground water contamination presently has been attributed to the sludge dump. A total of five alternatives were evaluated as potential remedies.
The "no action" alternative would allow the site to exist as it does presently with the exception of deed restrictions preventing future land development. The "no action" alternative was rejected as a remedy because the alternative would be unreliable and ineffective in protecting human health and the environment, and because the alternative does not comply with federal and state closure and post-closure requirements (ground water monitoring would be necessary). Additionally, the alternative does nothing to ensure a permanent solution.

Alternative 2 entails the installation of a RCRA cover over the sludge dump. Alternative 2 is rejected as a possible remedy due to the following concerns. First, this alternative proposes that no ground water monitoring be conducted at the site. This would not satisfy 40 CFR Part 264 Subpart F, which requiries the implementation of a ground water monitoring program when hazardous materials are left "in place". Second, as stated in Section 121(b) of SARA, those remedial actions that utilize treatment to permanently and

significantly reduce the volume, toxicity or the mobility of hazardous substances are given preference over those remedial actions that do not. Alternative 5 in the "sludge dump site array" better satisfies this statutory preference. Finally, this alternative would be unrealiable and questionably effective on the long-term in light of the fact that it proposes no ground water management program.

Alternative 3 and 4 propose essentially identical remedies, which involves excavation of the contaminated material (i.e sludge and/or soil) and transport and disposal off-site. Alternative 5 involves the excavation of all contaminated material from the sludge dump and solidification of the material in the sludge lagoon. Alternative 5 is selected over Alternative 3 and 4 for the following reasons. First, Alternative 5 explicitly satisfies the statutory preferences for treatment as a principal element (through sludge solidification), which alternative 3 and 4 do not. Second, Alternative 5 achieves a permanent solution that is protective of human health and the environment without utilizing off-site transport and disposal (that does not involve treatment), such as Alternatives 3 and 4. Finally, Alternative 5 meets the remedial objective and satisfies all relevant and appropriate federal and state requirements at a cost an order of magnitude less than either Alternative 3 or 4.

IX. Projected Schedule For NEC Cleanup

Sign Record of Decision	September 30, 1987
Project Remedial Design Complete	February 1, 1988
Initiate Ground Water Monitoring Program	February 15, 1988
Initiate Remedial Action Construction	March 1, 1988
Construction Complete	June 1, 1988
EPA Evaluates Ground Water Monitoring Program	February 15, 1993